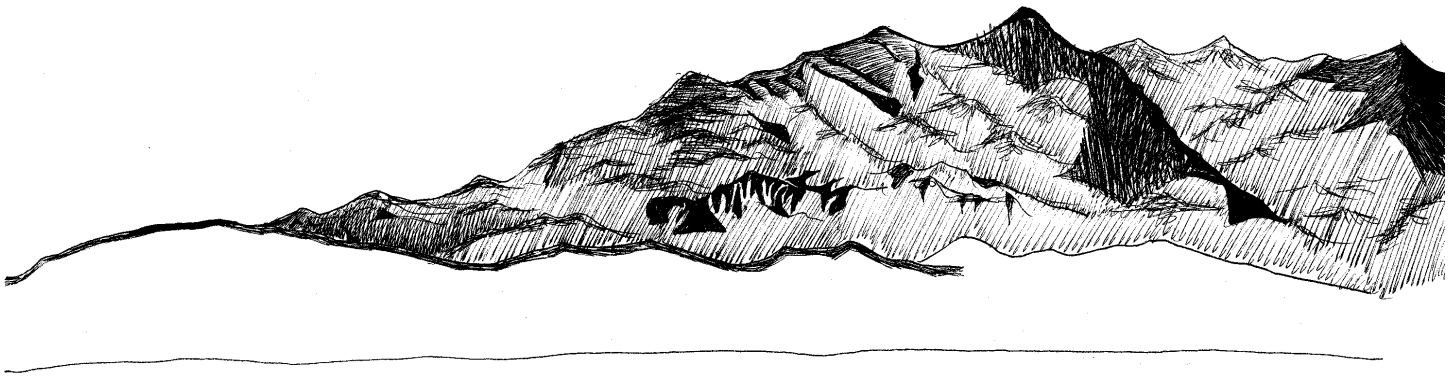
Lake Mead
National Recreation Area

National Park Service
U.S. Department of the Interior

Construction of the River Mountains Loop Trail within Lake Mead National Recreation Area

Environmental Assessment



Lake Mead National Recreation Area
Clark County, Nevada

November 2003

U.S. Department of the Interior, National Park Service

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

Page left intentionally blank.

SECTION I: PURPOSE OF AND NEED FOR ACTION

INTRODUCTION

The National Park Service (NPS) is proposing to construct a two-directional, multi-use trail, within the Boulder Basin development area of Lake Mead, at Lake Mead National Recreation Area(NRA). Lake Mead NRA is situated in southeastern Nevada and northwestern Arizona and encompasses lands around Lake Mead and Lake Mohave (Figure 1). The trail would be located in the highly developed and urbanized Boulder Basin area of Lake Mead NRA, extending from the park boundary with the City of Henderson to the park boundary with the City of Boulder City (Figure 2).

The proposed trail route would mostly utilize disturbed corridors and existing trails to provide a consistent and safe alternative transportation corridor, independent from vehicular traffic. The trail would accommodate pedestrians, bicyclists, wheelchairs and other trail users, in all or most sections of the trail. This project would also provide the trail segments necessary to complete the 35-mile River Mountains Loop Trail. The River Mountains Loop Trail would connect Lake Mead NRA, Hoover Dam, Boulder City, Henderson, and the rest of the Las Vegas Valley, expanding recreational and alternative transportation opportunities for the region's growing population and for visitors to southern Nevada (Figure 3).

The NPS is proposing to construct the River Mountains Loop Trail within Lake Mead NRA to provide a safe alternative transportation corridor, decrease the potential for pedestrian and motorist accidents, and increase the recreational opportunities for residents and visitors of southern Nevada while providing educational opportunities about the natural and cultural resources.

Figure 1. Regional Map
Lake Mead National Recreation Area

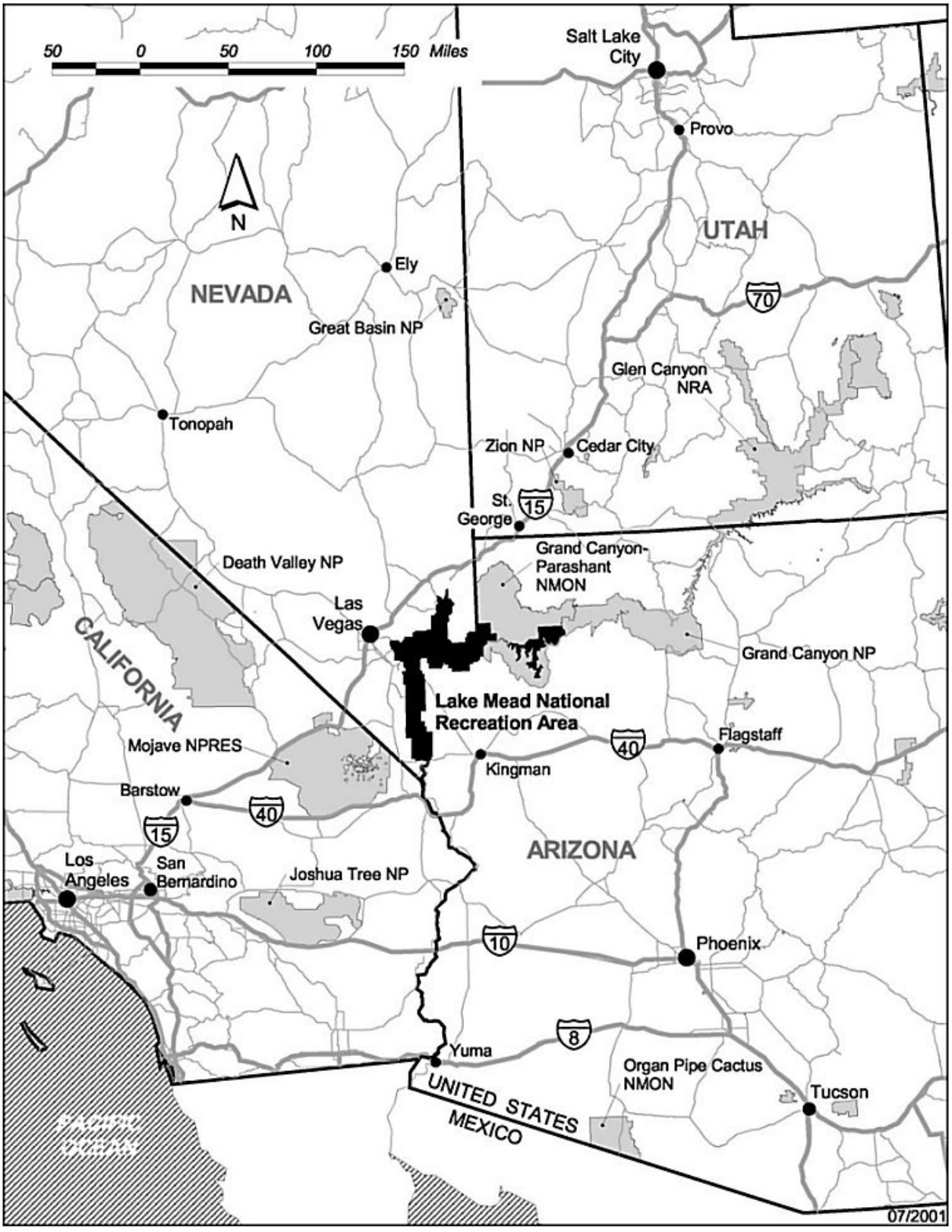
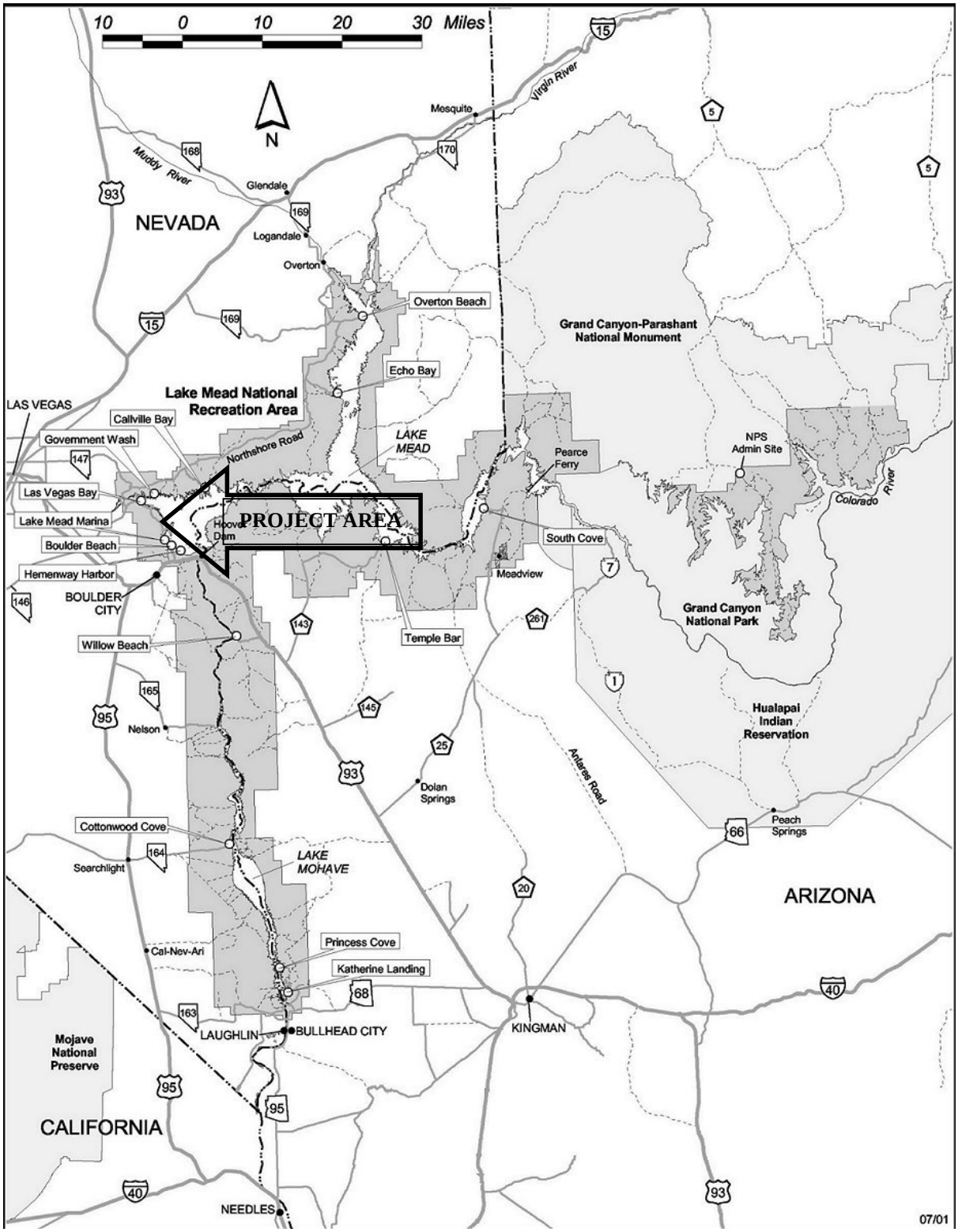


Figure 2. Area Map
Lake Mead National Recreation Area



This section describes the purpose of and need for action and provides an overview of the project area and the project history of the cooperative planning effort associated with this project.

The environmental assessment (EA) evaluates the no action alternative and one action alternative. The alternatives analyzed are: Alternative A: No action; and, Alternative B: Construction of the River Mountains Loop Trail within Lake Mead NRA. This document also includes discussions of alternatives that have been ruled out and justifications for their elimination.

PURPOSE AND NEED

The primary purpose of this project is to provide a safe alternative transportation corridor, independent of vehicular traffic, to improve recreational opportunities within the park for local residents and visitors to southern Nevada. An additional purpose of this project is to provide educational opportunities advocating stewardship of natural and cultural resources. A further purpose of this project is to link the urban communities of the Las Vegas Valley area, Boulder City, and Henderson with open space areas such as Lake Mead NRA and Hoover Dam.

There is an increasing demand for alternative transportation corridors between the urban communities of Las Vegas, Henderson, and Boulder City with recreational destinations such as Lake Mead NRA and Hoover Dam. Lake Mead NRA draws many local and out-of-state outdoor enthusiasts, including bicyclists, hikers, sight-seers, etc., as well as families seeking safe recreational opportunities. There is currently no approved multi-use trail within Lake Mead NRA, and bicyclists are forced to contend with traffic on Lakeshore Road and Northshore Road. The establishment of a scenic alternative transportation corridor would provide safe travel for individuals, families, pedestrians, and bicyclists, and could enhance the quality of life for residents and visitors to southern Nevada.

The Boulder Basin area of Lake Mead NRA is the most visited area in the park. There is currently a two-mile dirt trail which is utilized by some pedestrians and bicyclists, however, in areas where there is no trail, bicyclists are forced to ride on Lakeshore Road and compete with vehicular traffic, posing hazardous safety conditions. This trail would offer a safe alternative for bicyclists, hikers, equestrian riders, and would also be handicapped accessible in many trail sections.

The trail would be signed and informational kiosks and wayside exhibits would be provided. Trailheads would be located at strategic locations to provide logical travel distances. Shaded benches would be constructed at key points along the trail where visitors could rest and enjoy the vistas surrounding the Boulder Basin of Lake Mead NRA.

BACKGROUND

The overall 35-mile River Mountains Loop Trail is not the issue of this environmental assessment, but rather the 16-mile portion of the trail proposed within the Lake Mead NRA boundary.

River Mountains Trail Partnership

The NPS has been a partner in the planning of the 35-mile River Mountains Loop Trail. Planning for the River Mountains Loop Trail began in 1996, when a group of interested individuals and agencies from the community came together to talk about trails and local needs. This group, now called the River Mountains Trail Partnership (Partnership), was formally organized in 1998, and is an association of public agencies, community groups, businesses, and individuals committed to the development of the River Mountains Loop Trail. In 1998 the Partnership established a subgroup to facilitate communication between agency and community partners, assist with trail development and funding options, and implement the public education and outreach goals of the Partnership.

This group shared a common goal- to expand trail opportunities southeast of Las Vegas and to increase close-to-home recreational opportunities for the benefit of local residents and visitors to the area. The Partnership encourages incorporation of existing trail alignments as part of the River Mountains Loop Trail, where trail connectivity and continuity in design and trail attributes will contribute to achieving the goals of the project.

A trail corridor within Lake Mead NRA was identified by park managers in 1996. The identified corridor utilizes existing transportation and utility corridors to the maximum extent to minimize the disturbance to the natural environment. This portion of the trail would provide an additional 16 miles to the River Mountains Loop Trail.

RELATED LAWS, POLICIES, AND OTHER PLANNING DOCUMENTS

Servicewide and Park Specific Legislation and Planning Documents

The NPS Organic Act directs the NPS to manage units "to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such a manner as will leave them unimpaired for the enjoyment of future generations." (16 U.S.C. § 1). Congress reiterated this mandate in the Redwood National Park Expansion Act of 1978 by stating that the NPS must conduct its actions in a manner that will ensure no "derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress."

The Organic Act prohibits actions that permanently impair park resources unless a law directly and specifically allows for the acts. An action constitutes an impairment when its impacts "harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources and values." (Management Policies 1.4.3).

NPS Management Policies 2001 requires the analysis of potential effects of each alternative to determine if actions would impair park resources. To determine impairment, the NPS must evaluate "the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts." (Management Policies 1.4.4). The NPS must always seek ways to avoid or minimize, to the greatest degree practicable, adverse impacts on park resources and values. However, the laws do give the NPS management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment to the affected resources and values (Management Policies 1.4.3).

Lake Mead NRA was established in 1964 (PL 88-639), "for the general purposes of public recreation, benefit, and use, and in a manner that will preserve, develop and enhance, so far as practicable, the recreation potential, and in a manner that will preserve the scenic, historic, scientific, and other important features of the area, consistent with applicable reservations and limitations relating to such area and with other authorized uses of the lands and properties within such area."

NPS units vary based on their enabling legislation, natural and cultural resources, missions, and the recreational opportunities appropriate for each unit, or for areas within each unit. This environmental assessment analyzes the context, duration, and intensity of impacts related to the alternatives associated with constructing the River Mountains Loop Trail, as well as the potential for resource impairment, as required by Director's Order 12, *Conservation Planning, Environmental Impact Analysis and Decision Making.*

The 1986 *General Management Plan* (*GMP*) provided the overall management direction for Lake Mead NRA. It established management zones to accommodate increasing visitor use while protecting park resources. The 1986 *General Management Plan* established the Boulder Basin area as a development zone. However, trails were not addressed in the planning document.

The Lake Mead NRA *Lake Management Plan and final Environmental Impact Statement* (EIS) amended the information in the *General Management Plan* that related to visitor use and resource protection of Lakes Mead and Mohave. This plan addressed issues and alternatives related to existing facilities and potential facility expansion, carrying capacity, visitor use and recreational settings, personal water craft use, and resource protection. The preferred alternative within this document designated the Boulder Basin area as an urban park setting within the recreational opportunity zoning of Lake Mead.

The 1998 Lake Mead NRA Strategic Plan established goals relating to resource protection, public enjoyment, and visitor satisfaction. The 2001 Strategic Plan has reaffirmed these goals.

The *Lakeshore Road Reconstruction draft Environmental Impact Statement* discussed the construction of a paved (8-10 foot) bicycle/pedestrian trail stretching from the Lake Mead NRA boundary with Boulder City to the Visitor Center, along portions of the existing historic railroad grade. This project also included construction of a trailhead parking lot allowing access to the Historic Railroad Trail. Also discussed in the EIS was construction of a bicycle/pedestrian path above high water, connecting the trailhead, Boulder Beach developments, and Hemenway Harbor to Lake Mead Marina. The path would follow an existing disturbed utility corridor or an existing trail alignment parallel to Lakeshore Road. Because this document did not evaluate the trail to the urban standards, further analysis is required.

Other Project Related Planning Documents

The River Mountains Trail Partnership was formally organized in 1998, and is an association of public agencies, community groups, businesses, and individuals committed to the development of the River Mountains Loop Trail. As stated in the *River Mountains Loop Trail*: *A Trail Planning, Development, and Management Guide*, the purpose statement of the River Mountains Trail Partnership is working to "expand and protect trail opportunities in and around the rapidly urbanizing Las Vegas Valley for the benefit of local communities, their residents, and visitors to the region through the development of the River Mountains Loop Trail". More information regarding the River Mountains Loop Trail and the Partnership is available on the River Mountains Trail Partnership Internet Web site at http://rivermountainstrail.org.

Other plans recognizing the River Mountains Loop Trail project include *the Henderson Bicycle Plan* (approved in 1997) and the *Regional Transportation Commission Trail Plan for the Las Vegas Metropolitan Area* (1998). The *Guide for Development of Bicycle Facilities* (1999) was consulted in the planning for a safe, convenient, and well-designed trail.

ENVIRONMENTAL ASSESSMENT

This EA analyzes one action alternative and the no action alternative and their impacts on the human and natural environment. It outlines project alternatives, describes existing conditions in the project area, and analyzes the effects of each project alternative on the environment. This EA has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 and regulations of the Council on Environmental Quality (CEQ) (40 Code of Federal Regulations [CFR] 1508.9).

ISSUES AND IMPACT TOPICS

Issues are related to potential environmental effects of project alternatives and were identified by the project interdisciplinary team. Once issues were identified, they were used to help formulate the alternatives and mitigation measures. Impact topics based on substantive issues, environmental statutes, regulations, and executive orders (EOs) were selected for detailed analysis. A summary of the impact topics and rationale for their inclusion or dismissal is given below.

The project would occur in an established development zone within the recreation area, as identified in the Lake Mead National Recreation Area *General Management Plan* and *Lake Management Plan*. The resources in the area have been impacted from internal activities and development by park concessioners, the Southern Nevada Water Authority (SNWA), and the Nevada Department of Wildlife (NDOW). Development of adjacent lands including Boulder City, Henderson, and the community of Lake Las Vegas have increased park visitation.

ISSUES AND IMPACT TOPICS IDENTIFIED FOR FURTHER ANALYSIS

The following relevant impact topics are analyzed in the EA. Whether each issue is related to taking action or no action is specified.

Natural Resources

The trail was planned and developed in a manner that best protects sensitive natural, cultural, and historic resources.

Soils and Vegetation

Soils would be disturbed in the project area. Construction-related earthmoving activities could affect geologic processes or features or alter local topography. The majority of the trail would be situated in disturbed corridors and would utilize existing right-of-way corridors, paved areas, and trails when possible; however, new disturbance would occur in areas where no corridors exist and where widening of existing trails and corridors would occur. Trail construction would have linear and permanent impacts to soils. Sensitive gypsum outcroppings, providing potential habitat for the Las Vegas bearpoppy, could be disturbed.

Construction activities would affect vegetation. Vegetation would be permanently removed from the trail alignment where existing trails, utility, and road corridors would be either widened or where new construction would occur. After construction, nonnative vegetation could invade the project area. Nonnative species could also become established in the portion of the trail corridor designated for equestrian use.

Wildlife and Wildlife Habitat

The area does not provide high quality wildlife habitat; however, small mammals, reptiles, and birds that inhabit the area could be disturbed or displaced during construction. The trail alignment would permanently remove a linear portion of habitat, approximately 16 miles long, and 12 feet wide. Wildlife in the area may be disturbed from trail user activities and may seek habitat away from the trail.

The River Mountains is home for one of the premier bighorn sheep populations in Nevada. The trail would not traverse prime bighorn sheep habitat. However, bighorn habitat and travel routes are nearby. Bighorn sheep would be temporarily disturbed during construction, and could be temporarily disturbed by trail users.

Special Status Species

Threatened, endangered, or other special status species in or near the project area could be affected during construction.

The proposed project would take place in desert tortoise habitat. Construction of the trail would primarily affect previously disturbed, uninhabited habitat. The tortoise population has already been affected by the construction of Lakeshore Road and from underground utility lines installation. There is an existing tortoise fence in the project area from mitigation requirements associated with the Lakeshore Road Rehabilitation project.

Water Resources

The proposed trail corridor would pass through numerous ephemeral washes. Construction activities in the washes could temporarily increase sediment in the project area. The addition of culverts and/or bridges could moderate water flows in the washes and decrease erosion.

Air Quality

Airborne particulates could increase in the area of construction during the work effort and for a time following its completion. The intermittent dust created by construction activities could compromise air quality and temporarily decrease visibility in the project area. Exhaust from construction equipment could temporarily impact air quality in the project area.

Soundscapes

Construction-related noise could temporarily disturb sensitive receptors in the project area.

Cultural Resources

Both prehistoric and historic cultural resources are located in the Boulder Basin. Prehistoric sites include rock shelters and artifact scatters. Historic resources are related to early mining activity, construction of Hoover Dam, development of the park's tourism infrastructure, and World War II industrial development. Construction of the trail could have an impact on several of these resources.

Visual Resources

The project area is located in a high-use area of the park. The route designated for this trail mostly follows existing right-of-way corridors, paved areas, and trails. The paved surface of the trail and the construction of trailhead kiosks and wayside exhibits could detract from the natural setting.

Public Safety and Visitor Experience

Visitor experience could improve with the proposed trail, as it would offer an alternative mode of transportation for visitors and residents of southern Nevada. This could benefit both those utilizing the trail, and those driving through the park, as it could decrease potential accidents between motorists and nonmotorists on Lakeshore Road. Park visitation could increase during the winter months, when visitation is usually not as high.

Park Operations
Maintenance of the trail corridor, including trail maintenance, trash maintenance, and monitoring and eradicating nonnative species along the trail would increase. NPS bike patrols would be implemented to periodically monitor trail activities.

IMPACT TOPICS CONSIDERED BUT DISMISSED FROM FURTHER CONSIDERATION

The following topics are not further addressed in this document because there are no potential effects to these resources, which are not in the project area:

- Designated ecologically significant or critical areas;
- Wild or scenic rivers;
- Wetlands;
- Floodplains;
- Designated coastal zones;
- Indian Trust Resources;
- Prime and unique agricultural lands;
- Sites on the US Department of the Interior's National Registry of Natural Landmarks; or
- Sole or principal drinking water aquifers.

In addition, there are no potential conflicts between the project and land use plans, policies, or controls (including state, local, or Native American) for the project area.

Neither the no action alternative nor the proposed action would appreciably affect local businesses outside Lake Mead NRA or agencies, therefore a discussion on the socioeconomic environment was dismissed from discussion. Discussion regarding adjacent lands was dismissed from this analysis because these entities have been involved in the planning of the River Mountains Loop Trail and are aware of the potential impacts and issues associated with trail construction. The proposed trail route has been incorporated into community and regional plans and environmental compliance has been addressed as part of transportation and utility projects.

Regarding energy requirements and conservation potential, construction activities would require the increased use of energy for the construction itself and for transporting materials. However, overall, the energy from petroleum products required to implement action alternatives would be insubstantial when viewed in light of production costs and the effect of the national and worldwide petroleum reserves.

There are no potential effects to local or regional employment, occupation, income changes, or tax base as a result of this project. The project area of effect is not populated and, per EO 12898 on Environmental Justice, there are no potential effects on minorities, Native Americans, women, or the civil liberties (associated with age, race, creed, color, national origin, or sex) of any American citizen. No disproportionate high or adverse effects to minority populations or low-income populations are expected to occur as a result of implementing any alternative.

SECTION II: DESCRIPTION OF ALTERNATIVES

INTRODUCTION

This section describes the alternatives considered, including the no action alternative. The alternatives described include mitigation measures and monitoring activities proposed to minimize or avoid environmental impacts. This section also includes a description of alternatives considered early in the process but later eliminated from further study; reasons for their dismissal are provided. The section concludes with a comparison of the alternatives considered.

ALTERNATIVE A- NO ACTION
No Construction of the River Mountains Loop Trail within Lake Mead NRA

Under this alternative, the River Mountains Loop Trail Segments 17 to 22 would not be constructed. There would be no alternative transportation route for bicyclists and other trail users along Lakeshore Road within Lake Mead NRA, and there would be no 35-mile loop trail connecting Lake Mead NRA and the Hoover Dam with Boulder City, Las Vegas, and Henderson. The existing 3-foot wide, 2-mile long Boulder Beach gravel trail, extending from the Historic Railroad Trail parking lot to Lake Mead Marina, would remain the only alternative transportation route for non-motorists along Lakeshore Road.

ALTERNATIVE B- ENVIRONMENTALLY-PREFERRED AND MANAGEMENT-PREFERRED ALTERNATIVE
Construct River Mountains Loop Trail within Lake Mead NRA

Alternative B proposes construction of the 16-mile segment of the River Mountains Loop Trail within Lake Mead NRA. The trail would traverse from the Lake Mead Drive Entrance Station to the Lake Mead NRA boundary with Boulder City. The trail would utilize existing right-of-way corridors, paved areas, trails, and marginal habitat, to the greatest extent possible, for trail construction. Existing trails and disturbed corridors along the proposed trail route would be widened and paved to provide for the 12-foot wide asphalt trail with two 2-foot wide shoulders on both sides (Figure 3).

The trail would cross over numerous ephemeral washes and over the larger Hemenway Wash. Concrete box culverts would be constructed in Hemenway Wash to allow water to flow under the trail and along the wash during flood events. Culverts and/or bridges could be constructed in the smaller ephemeral washes, to allow for water flow. Low-water crossings are also being considered.

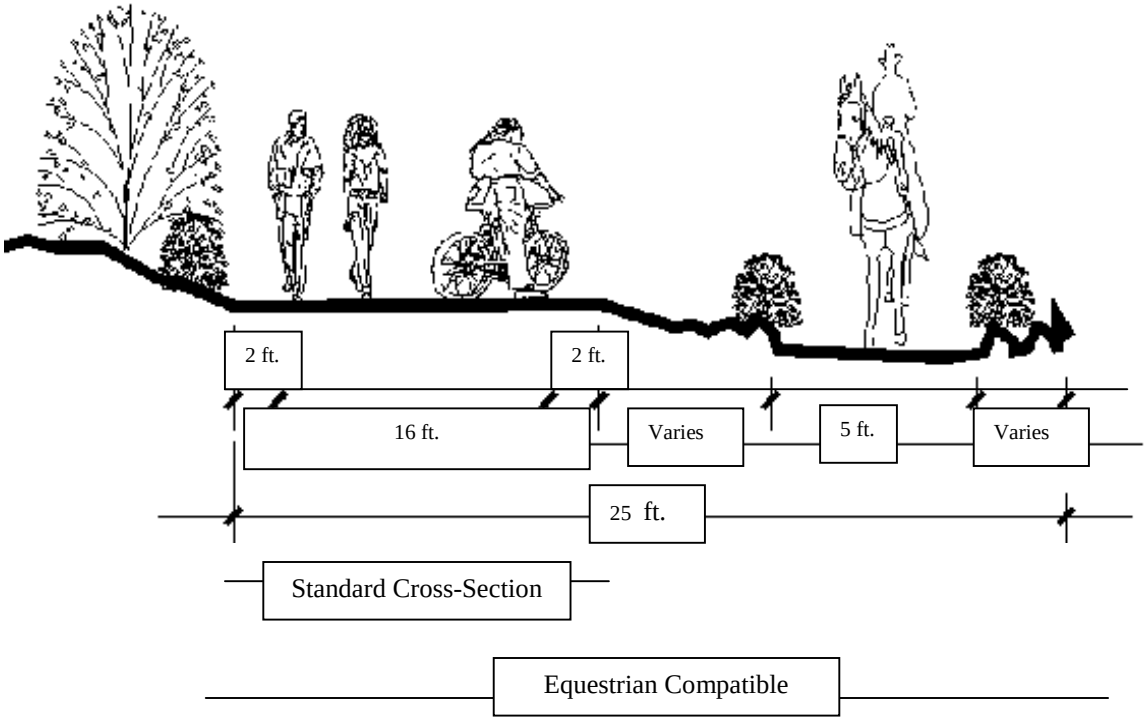
Alternative B would also provide a 2-mile equestrian compatible portion of the trail. This portion of the trail would extend from the Lake Mead Drive Entrance Station to Las Vegas Bay. The width of the trail in this area would be 25 feet, to provide for equestrian activities and to accommodate other trail users.

Figure 3. Photo of Completed Trail Segment

Trail design

The trail is designed to accommodate a variety of trail-users including bicyclists, pedestrians, equestrians, and wheelchairs in certain locations (Figure 4). In-line skating is prohibited under an existing NPS policy. However, Lake Mead NRA may consider a special regulation that would allow in-line skating on this trail. Existing transportation routes and utility corridors were considered when determining the least disruptive trail alignment. Trail design considered the topography and slope in the project area to determine accessibility and contour. The American Association of State Highway and Transportation Officials (AASHTO) *Guide for Development of Bicycle Facilities* was consulted during the trail design. The guide provides recommendations on grade restrictions, grade lengths, and options for mitigating excessive grades (AASHTO 1999). These recommendations were implemented in the trail design whenever possible to provide for a variety of trail uses. According to requirements listed in the Americans with Disabilities Act (ADA), cross slopes should not exceed 2 to 3% in order to avoid the severe difficulties that greater cross slopes can create for people using wheelchairs. Depending on terrain, available right-of-way corridors, and environmental impact, not all trail segments could be designed to accommodate all trail users. Therefore, segments of the 16-mile portion of trail within Lake Mead NRA may not be appropriate for all trail-users. However, a spectrum of trail uses would be available to accommodate all trail users on portions of the 35-mile River Mountains Loop Trail.

Figure 4. Proposed Cross-Section of Trail



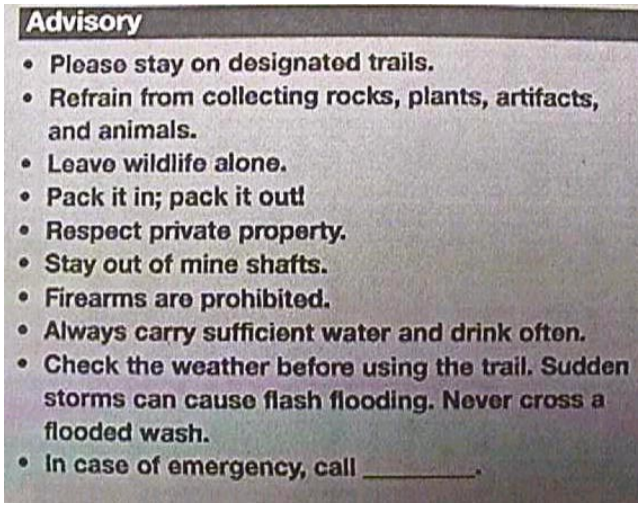
Kiosks and Wayside Exhibits
Interpretation of the River Mountains Loop Trail would consist of two components, trailhead kiosks and wayside panels (Appendix A).

Trailhead Kiosks
Kiosks would be placed at each major trailhead along the trail. An existing kiosk, parking area, and trail access point is located at the Historic Railroad Trailhead near the Alan Bible Visitor Center, which would become a connector trail leading to Hoover Dam. Other potential kiosk locations within Lake Mead NRA, include the Wetlands Trail, Nevada Department of Wildlife Fish Hatchery, Southern Nevada Water Authority, Lake Mead Marina, Boulder Beach, Lake Mead Cruises, and Las Vegas Bay.

Each kiosk would consist of a shade structure and three panels of information (interpretive panels), a map, a resource protection and safety panel, and an introductory interpretive panel (Figure 5). Kiosks would be made of durable materials that can withstand the heat and sun of the Nevada desert, and materials would also need to be resistant to vandalism. Kiosk design would be inviting and aesthetically pleasing, but not intrude on the environment or the viewshed. Kiosks would have consistent design, style, and information.

Locations for priority trailheads adjacent to Lake Mead NRA land include: Lake Mead Drive South at the proposed underpass on City of Henderson land, and Pacifica/Hemenway Wash Trail in Boulder City.

Figure 5. Trailhead Kiosk and Potential Kiosk Informational Sign



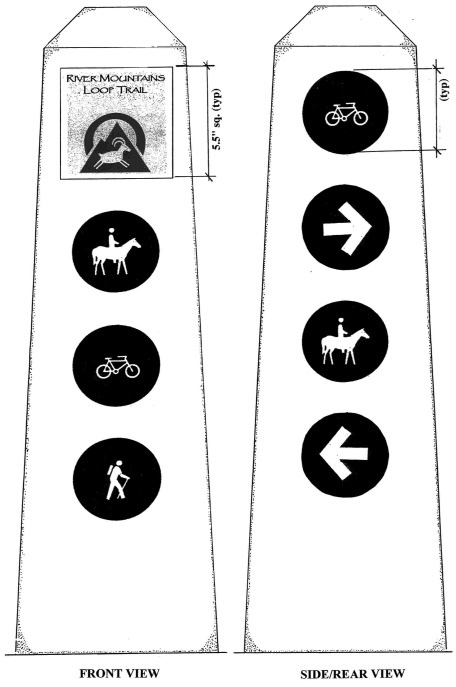
Wayside Exhibits

Wayside exhibits are outdoor signs with text and graphics that interpret something that is nearby. Locations of wayside exhibits proposed within Lake Mead NRA include: three at Las Vegas Wash, along the abandoned Lakeshore Road looking onto Lake Mead, near the Southern Nevada Water Authority facility on Lake Mead, along the Historic Railroad Trail, and near Lake Las Vegas.

Trail Signage

The River Mountains Trail Partnership encourages appropriate directional signage along the route of the trail to promote public safety and an enjoyable trail, while considering potential resource and visual impacts. Trail signs are square measuring 6 inches across and standard logo colors are brown and white. The backs of all exposed signs are painted brown. Trail signs are generally mounted on trail marker monuments specially designed for the River Mountains Loop Trail. The trail marker monuments are constructed of reinforced precast concrete and have an overall height of 32 inches, not including the footing (Figure 6). The monuments would have integral color added during production using inorganic pigments which are alkalinity resistant and have a surface sealer which resists graffiti. Trail logo signs would be used to identify River Mountains Loop Trail, to guide users along the trail, and to direct users from connecting trails to the River Mountains Loop Trail. The signs would generally be located along the trail every half mile and at primary trail junctions, trailheads, and other major access points. In addition, arrows and "to" signs may be used at trail junctions and in conjunction with logo signage to direct trail users to the River Mountains Loop Trail from a connector trail that originates at a trailhead or other access point.

Figure 6. River Mountains Loop Trail Marker Monument



Trail Maintenance

Based on the recommendations from the Trail Partnership, maintenance would minimally consist of the activities outlined below.

- Trail Maintenance Survey: Each year, the Partnership would complete a maintenance survey of the entire trail noting general conditions and problem areas, to determine maintenance needs.

- Trail Drainage: In general, regular maintenance will be needed after each significant rainfall to remove rocks, debris, and to fill holes and cuts made by running water. Where the trail crosses a larger drainage or wash above grade using bridges, tunnels, or large drain pipes; maintenance may include checking for erosion around structures, cleaning out drainpipes and clearing debris from tunnels. If a large drainage is crossed at grade, maintenance would include grading or restoration of the trail tread after each significant rainfall.

- Water Bars: Maintenance of water bars would be completed once or twice a year to ensure proper drainage, and would be installed to prevent erosion.

- Trail Brushing/Clearing: Once a year, the trail's natural surface tread would be raked or bladed to remove plant growth including all roots and stumps. In general, the area cleared would extend 2 to 3 feet back from the edge of the trail tread. Precautions would be taken to avoid damaging natural vegetation beyond the set back.

- Trail Rock Clearing/Placement: All loose rocks larger than 2 inches in diameter within the trail tread would be removed. Trails would be surveyed after heavy rainfalls and loose rocks would be moved to the edge of the trail.

- Trail Sign Maintenance: Signs would be regularly checked for weathering and vandalism and replaced or repaired, as appropriate. In general, wooden posts and signs would be painted annually. Signs may be added or replaced to aid in user access or resource interpretation and protection.

- Trail Clean-Up: During routine trial maintenance, litter removal would be completed. Annual cleanups would be scheduled based on needs identified in trail maintenance surveys. Trash cans would be provided wherever possible at trailheads, but only where there is a designated managing agency to ensure regular trash disposal.

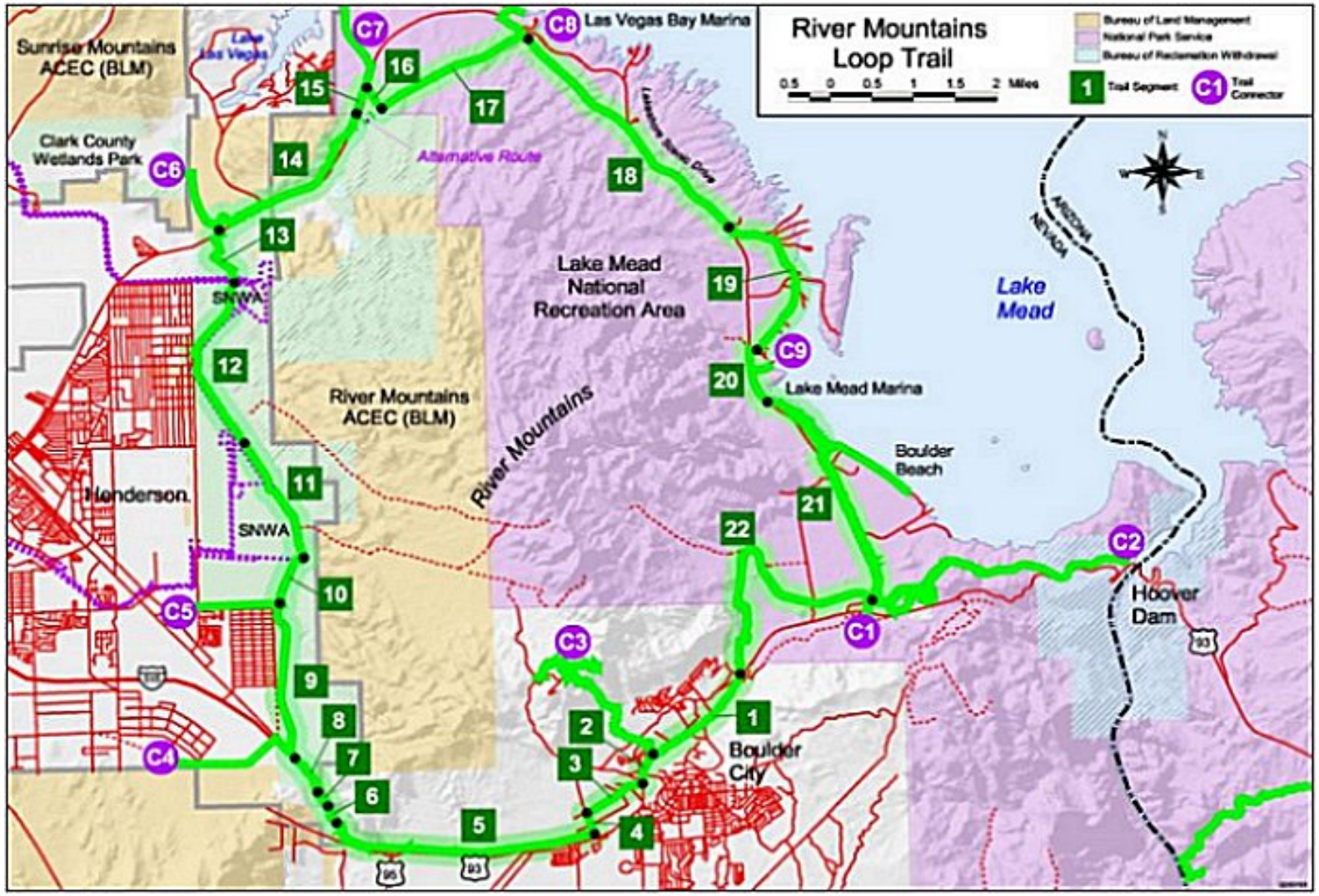
- Weeds Removal: Invasive plants often follow disturbance, including the activities of humans. Invasive plant seeds can be carried into the park by hiking shoes, bicycles, and horses. The trail would be surveyed for introductions of invasive alien species of plants on a regular and ongoing basis. Invasive plant removals would be accomplished at least twice a year, in the spring and fall.

Completed and Proposed Connector Trails Within Lake Mead NRA

A connector trail is a trail that provides direct access to the River Mountains Loop Trail along a continuous alignment or other access point. If the River Mountains Loop Trail is constructed, the Historic Railroad Trail would serve as a connector trail to the River Mountains Loop Trail. The completed portion of the Historic Railroad Trail (C1) extends from the Alan Bible Visitor Center east through five tunnels to the end of Tunnel 5 (Figure 7). Bureau of Reclamation is preparing the environmental analysis document which would extend the Historic Railroad Trail from Tunnel 5 east along the historic railroad bed and power line right-of-way to the Hoover Dam Visitor Center (C2) (Figure 7). The Historic Railroad Trail is expected to be completed in 2007.

Page left intentionally blank.

Figure 7. River Mountains Loop Trail Proposed Segments and Connector Trails

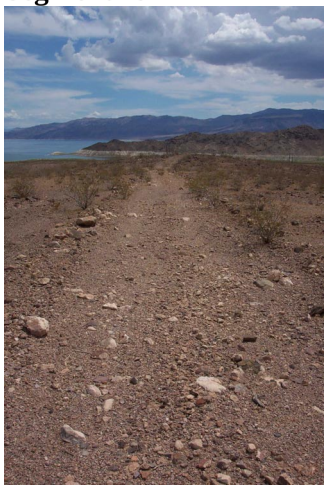


Page left intentionally blank.

Table 1. Segments of the River Mountains Loop Trail Within Lake Mead NRA
Alternative B- Preferred Alternative

	Location	Total Acreage Proposed for Trail Construction	Existing Disturbance	New Disturbance	Proposed Paving of Unpaved Corridors
Segment 17  **Figure 8**. Segment 17 Project Area BMI pipeline road	This 2-mile segment begins at Lake Mead Drive near the park boundary at the BMI pipeline right-of-way and follows the BMI pipeline road easterly until it intersects with the abandoned Lakeshore Road ~ 1/3 mile south of the intersection with Las Vegas Bay turnoff.	7.27 acres	Existing Water Pipeline Corridor- Unpaved corridor is approximately 20 ft. wide and crosses numerous washes. Approximate Existing Disturbance-4.85 acres	Topography may be a challenge and would require deviation from the existing corridor to provide a suitable slope for trail use. Culverts and/or bridges may be necessary for safe crossing over the washes. Trail width would be 25 ft. in this area to accommodate equestrian use. A width of 30 ft. was used in calculating the approximate new disturbance to account for potential switchbacks in the trail corridor. Approximate New Disturbance- 2.42 acres	2.91 acres would be paved 1.21 acres would have a compacted gravel surface for equestrian use.

	Location	Total Acreage Proposed for Trail Construction	Existing Disturbance	New Disturbance	Proposed Paving of Unpaved Corridors
Segment 18  **Figure 9**. Segment 18 Project Area Abandoned Lakeshore Road	This 3.4-mile segment begins at the BMI intersection with the abandoned Lakeshore Road and ends at the south end of the abandoned Lakeshore Road near the NDOW Fish Hatchery access road.	6.6 acres	Existing Abandoned Lakeshore Road Corridor-Follows the BMI waterline within the paved abandoned Lakeshore Road alignment the entire way. Approximate Existing Disturbance-6.6 acres	No New Disturbance- The existing paved corridor is approximately 26-ft. wide. Twelve feet could be improved and resurfaced for trail use.	Existing pavement.

	Location	Total Acreage Proposed for Trail Construction	Existing Disturbance	New Disturbance	Proposed Paving of Unpaved Corridors
Segment 19  **Figure 10**. Segment 19 Disturbed corridor parallel to Saddle Cove Access Road  **Figure 11**. Segment 19 Approved Road 78	This 2.2-mile segment begins at the south end of Lakeshore Road at NDOW Fish Hatchery access road, and ends at the intersection of Abandoned Road 78 and Lakeshore Road.	4.27 acres	The trail would cross under Lakeshore Road near NDOW Fish Hatchery via 15-foot diameter culvert and would parallel the Saddle Cove Access Road to the Alfred Merritt Smith Water Treatment Facility. From the Alfred Merritt Smith Water Treatment Facility, the 20-ft. wide Approved Road 78 would be utilized to extend the trail to Lakeshore Road. Approved Road 78 would be closed and a new access road leading to the fishing dikes would be developed once Lake Mead water levels increase. Approximate Existing Disturbance-3.55 acres	New disturbance would occur to a section of land, approximately 600 meters, parallel to the Saddle Cove Access Road. The rest of the trail along this stretch would follow a previously disturbed corridor. The existing unpaved Approved Road 78 is approximately 20 ft. wide and extends from Alfred Merritt Smith Water Treatment Facility to Lakeshore Road along the high water line. There would be no new disturbance along this route. Approximate New Disturbance- 0.72 acres	3.2 acres would be paved

	Location	Total Acreage Proposed for Trail Construction	Existing Disturbance	New Disturbance	Proposed Paving of Unpaved Corridors
Segment 20  **Figure 12**. Segment 20 Project Area Partially Restored Corridor	This 0.8 mile segment extends from the intersection of Approved Road 78 and Lakeshore Road to Lake Mead Marina.	1.55 acres	Segment 20 would parallel Lakeshore Road for 0.8 mile, leading to Lake Mead Marina. Corridor has been previously disturbed, but was partially restored. The corridor is considered undisturbed for this assessment.	This segment is located in a previously disturbed corridor, however it has been partially restored and is therefore considered new disturbance. Approximate New Disturbance- 1.55 acres	1.16 acres

	Location	Total Acreage Proposed for Trail Construction	Existing Disturbance	New Disturbance	Proposed Paving of Unpaved Corridors
Segment 21  **Figure 13**. Segment 21 Project Area Boulder Beach Trail	This 3.2-mile segment begins at the intersection of Lakeshore Road and the access road to Lake Mead Marina, and terminates at Lawler Junction Trailhead. This segment was previously evaluated in the Lakeshore Road EIS(1993).	6.2 acres	Existing Corridor- The existing pedestrian/bike trail (Boulder Beach Trail) is 3-feet wide. Approximate Existing Disturbance-1.16 acres	The 3-feet wide unpaved trail would be widened and paved. Approximate New Disturbance- 5.04 acres	4.65 acres
Segment 22  **Figure 14**. Segment 22 Historic Railroad Trail	This 3.6-mile trail segment begins at the Lawler Junction Trailhead and ends at Lake Mead NRA boundary at Pacifica Way Trailhead.	6.98 acres	Existing Corridor- The existing Historic Railroad Trail corridor is approximately 20-feet wide. Approximate Existing Disturbance-6.98 acres	This segment is located in a previously disturbed unpaved corridor. There would be no new disturbance in this section.	Paving the trail segment would result in permanent change to 5.24 acres.

	Location	Total Acreage Proposed for Trail Construction	Existing Disturbance	New Disturbance	Proposed Paving of Unpaved Corridors
Connector Trail- C 8  **Figure 15**. C 8 Connector Trail Ephemeral wash area	This 0.52-mile connecting trail would be constructed leading from the Abandoned Lakeshore Road to Las Vegas Bay via a 15-foot diameter culvert.	1.02 acres	Ephemeral Wash- The trail would utilize a wash for transport to Las Vegas Bay. The wash is considered a disturbed corridor, therefore no new disturbance would occur to this 400 meter section. Approximate Existing Disturbance- 0.48 acre	New disturbance would occur to 437 meter section of land parallel to Lakeshore Road. Approximate New Disturbance- 0.54 acre	Paving this connecting trail would result in permanent change to 0.76 acre.
TOTALS	15.72 miles of Trail	33.89 acres total acres for trail construction	23.62 acres of existing disturbance	10.27 acres of new disturbance	17.92 acres paved 1.21 acres compacted surface

Table analysis:

- Approximately 33.89 acres would be utilized in the construction of the River Mountains Loop Trail.
- Of the 33.89 acres proposed for the trail, approximately 23.62 acres have been previously disturbed.
- Of the 33.89 acres proposed for the trail, approximately 10.27 acres would be newly disturbed.
- Of the 33.89 acres proposed for the trail, approximately 17.92 acres (of previously disturbed land and newly disturbed land) without existing pavement would be paved.

FIGURE 16

Page left intentionally blank.

FIGURE 17

Page left intentionally blank.

FIGURE 18

Page left intentionally blank.

FIGURE 19

Page left intentionally blank.

FIGURE 20

Page left intentionally blank.

MITIGATION AND MONITORING

Mitigation measures are specific actions designed to minimize, reduce, or eliminate impacts of alternatives and to protect Lake Mead NRA resources and visitors. Monitoring activities are actions to be implemented during or following construction. The following mitigation related to trail construction and use would be implemented under each alternative, and are assumed in the analysis of effects for each alternative.

Soils and Vegetation

Trail design considers the topography of the area and utilizes disturbed corridors and existing paved areas and trails in the planning and recommendation of the proposed trail alignment. Revegetation work would use desert topsoil conserved along the corridor and seeds from native species. Revegetation efforts would also attempt reconstruction of natural spacing, abundance, and diversity of native plant species. No imported topsoil would be used during revegetation, in an effort to avoid introduction of exotic plant species. To prevent the introduction of and to minimize the spread of exotic vegetation and noxious weeds, the following measures would be implemented:

- Minimize soil disturbance;
- Pressure-wash all construction equipment before it is brought into Lake Mead NRA;
- Obtain all fill, rock or additional topsoil from the project area;
- Salvage and store desert soil and gypsum soils separately, and replace as close as possible to original location;
- Initiate revegetation efforts of all disturbed sites immediately following construction activities by spreading desert soil with its associated seed bank;
- Monitor disturbed areas for the presence of nonnative species and initiate control strategies if these species occur in the area;
- Periodically monitor the trail segment authorizing equestrian use for evidence of nonnative species; and
- Initiate patrols and clean-up efforts of the trail corridor in the spring and fall of each year.

Wildlife

NPS monitor will be present during construction to ensure wildlife are not harmed by equipment and crews.

Special Status Species

<u>Desert Tortoise</u>

Mitigation measures that would be implemented to minimize adverse effects to the desert tortoise, including habitat loss, degradation, and fragmentation; direct mortality from construction activity; and common raven predation are presented as follows:

- The clearing limits (construction limits) would be clearly marked or flagged prior to construction. All construction activities, including staging areas, would be located within previously disturbed areas and fenced if necessary. They would be surveyed for desert tortoise presence, including burrows, prior

to use. Temporary desert tortoise fence would be installed along both sides of the proposed trail corridor to deter tortoises from crossing the construction zone during construction.

- Use qualified and authorized biologists for all activities within the trail corridor. A qualified NPS employee would be designated the field contact representative to oversee project compliance and coordination.

- The project area would be surveyed by a qualified biologist for desert tortoise and their burrows and dens, immediately prior (within 24 hours) to the onset of construction in any given area. The results of the surveys would be to remove all desert tortoises currently on the project site and identify all burrows that would be avoided during construction. All desert tortoise surveys, handling of desert tortoises, and burrow excavation would be performed by a qualified or authorized biologist.

- Desert tortoise burrows found within the project area would be avoided. They would be protected with desert tortoise-proof fence, placed at a minimum of 20 feet from the burrow on sides bordered by construction, to prevent crushing of underground portions of the burrow. The fencing would remain in place until construction in the vicinity was completed. Placement, inspection, and removal of fencing would occur under the direction of a qualified biologist.

- Desert tortoise burrows found within the project area that could not be avoided during construction, would be excavated by hand to determine if the burrows were occupied and to remove any desert tortoises present. All desert tortoises found within the project area, whether above ground or in excavated burrows, would be placed 300 to 1,000 feet outside of the clearing limits in the direction of undisturbed habitat. Handling and placement of desert tortoises would be performed in accordance with procedures identified in consultation with the Service. NPS biologists would be contacted to determine the best time of year for excavation of burrows and relocation of desert tortoises.

- The contractor must protect against intrusion by desert tortoises at sites with potential hazards (auger holes, steep-sided depressions, etc.).

- Construction personnel would be trained on the occurrence and status of the desert tortoise and would be advised of the potential impacts to desert tortoises and potential penalties for taking a threatened species. Following training of project staff, each trained individual would sign a completion sheet to be placed in file at Lake Mead NRA.

- A litter control program would be implemented during construction to eliminate the accumulation of trash to avoid attracting common ravens that

may prey on juvenile desert tortoise. Trash would be removed to trash containers following the close of each workday, and disposed outside Lake Mead NRA in a sanitary landfill at the end of each work week.

- Habitat disturbed by construction would be revegetated and surface reclamation of the disturbed areas would be performed to advance recovery of the habitat. At a minimum, the following measures would be considered: salvage of desert topsoil, rocks, and plants; scarification and recontouring disturbed sites; replacement of desert topsoil, surface armor rock, and large rocks; seeding and planting with native species; and application of a chemical weathering agent to replicate the natural coloring of the surface layer.

- Monitoring of revegetated and disturbed sites to ensure that the effort is effective and that exotic species do not become dominant.

- Ensure that the environmental education program remains active so that desert tortoise fencing and revegetation areas are not vandalized out of ignorance and that feeding of the common ravens near the boat ramps and parking lots and improper trash disposal are discouraged.

- Provide information on the natural and cultural resources in the area; including a wayside exhibit specifically about the desert tortoise, its habitat, threats to its survival, and what to do or not to do if a trail user encounters desert tortoise.

Water Resources

Erosion control measures would be implemented to minimize minor and short-term impacts to water quality. Sediment traps, erosion check structures, and/or filters would be considered. Best Management Practices (BMPs) are means of preventing or reducing nonpoint source pollution in the wash and of minimizing soil loss and sedimentation. BMPs would minimize impacts to the wash and would include all or some of the following features, depending on site-specific requirements:

- Locating waste and excess excavated materials outside the wash to avoid sedimentation;
- Prior to construction, installing silt fences, straw bale barriers, temporary earthen berms, temporary water bars, sediment traps, stone check dams, brush barriers, or other equivalent measures, including installing erosion-control measures around the perimeter of stockpiled fill material;
- Conducting regular site inspections throughout the construction period to ensure that erosion-control measures were properly installed and function effectively;
- Properly storing, using, and disposing of chemicals, fuels, and other toxic materials; and
- Refueling construction equipment in upland areas only, to prevent fuel spills near water resources.

Air Quality
Dust control measures would be implemented by the contractors to minimize the impacts to air quality associated with ground disturbance and construction activities. All necessary reasonable measures will be taken to reduce air pollution, including wetting down dry materials during earth-disturbing activities, utilizing or removing excavated materials as soon as possible, and keeping the project neat, orderly, and in a safe condition at all times. Low-sulfur fuel would be used where available.

Cultural Resources
The River Mountains Loop Trail is located on and adjacent to several historic properties (historic properties are cultural resources that are listed or are eligible for listing on the National Register of Historic Places). The following steps will be taken to avoid or minimize impacts to historic properties: the route of the trail will be modified to avoid historic properties, the trail will be designed to avoid or minimize impacts to site integrity. The NPS will evaluate the effects of the project on the historic properties and consult as outlined in the Nationwide Programmatic Agreement Among the NPS (U.S. Department of the Interior), the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers.

The park's cultural resources staff will document the potential effect of the project on the historic properties within the area of potential effect (APE) for the project. The park's cultural resource advisors will review the documentation. If it is determined that the project will have no adverse effect on the historic properties, then a copy of the documentation and any review comments will be sent to the Nevada State Historic Preservation Office (SHPO) for their files. If it is determined that the effects of the project will be adverse or that the programmatic exclusions of the Nationwide Programmatic Agreement are not applicable, then the NPS will consult with the SHPO as required by 36 CFR Part 800.

Visual Resources
The trail would be designed under National Park Service trail standards and an attempt would be made to utilize the area topography to blend in the trail with the surrounding terrain. Kiosks, trailheads, wayside exhibits, and trail signage would be consistent along the 35-mile trail corridor.

Park Operations
Volunteers and partnering with local groups would be initiated for maintenance and monitoring of the trail. Trail patrols would be implemented to ensure safety and compliance with trail objectives and uses.

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER EVALUATION

Trail Surface Alternatives Considered

Numerous options were considered in determining the best surface for the River Mountains Loop Trail. Life of the surface and maintenance requirements were important factors in looking for a sustainable surface that would be compatible with a variety of recreational and environmental settings and which would accommodate pedestrian and bicycle use. Alternative trail surfaces were eliminated from further analysis if they would not provide for these uses or if they were not consistent with the American Association of State Highway and Transportation Officials (AASHTO) standards for urban trail construction.

Also, in an effort to remain consistent with the rest of the 35-mile River Mountains Loop Trail, and to offer trail users the widest spectrum of recreational opportunities, the alternative to not pave the portion of the River Mountains Loop Trail within Lake Mead NRA was ruled out. The portion of trail within Lake Mead NRA makes up 16 of the 35 miles of the River Mountains Loop Trail, and would therefore affect the intended goals of constructing the trail to offer recreational opportunities to bicyclists, hikers, in-line skaters, and wheelchairs.

Potential Connector Trail Within Lake Mead NRA

A connector trail is a trail that provides direct access to the River Mountains Loop Trail along a continuous alignment or other access point. An alternative to construct a connector trail leading from Lake Mead Drive Entrance Station to the Wetlands Trail trailhead was considered but dismissed from further evaluation in this document. A separate document would be prepared to evaluate this project before its conception.

CONSULTATION, COORDINATION, AND PERMIT REQUIREMENTS

A press release was provided to area newspapers on November 6, 2002 to announce the scoping period (Appendix B). No comments were received during the 30-day scoping period.

In addition, the following consultation and coordination will occur as part of this environmental assessment.

- U.S. Army Corp of Engineers Section 10 Permit Requirements
- Nevada State Historic Preservation Office
- Clark County Dust Control Permit
- Formal consultation with the U.S. Fish and Wildlife Service
- Public distribution and review of EA (30 days)

ENVIRONMENTALLY PREFERRED ALTERNATIVE

The environmentally preferred alternative is the alternative that will promote NEPA, as expressed in Section 101 of NEPA. This alternative will satisfy the following requirements:

- Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
- Assure for all generations safe, healthful, productive, and esthetically and culturally pleasing surroundings;
- Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable or unintended consequences;
- Preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice;
- Achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities; and,
- Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Alternative B is the environmentally preferable alternative because overall it would best meet the requirements in Section 101 of NEPA. It would assure for all generations a safe, healthful, and esthetically pleasing surrounding. Establishing a multi-use trail would allow for a wide range of beneficial uses of the environment by Southern Nevada residents and visitors without degradation, risk to health or safety, or other undesirable or unintended consequences. It would achieve a balance between population and resource use, and permit high standards of living and a wide sharing of life's amenities.

COMPARISON OF IMPACTS

Table 2 summarizes the potential long-term impacts of the proposed alternative. Short-term impacts are not included in this table, but are analyzed in the Environmental Consequences section. Impact intensity, context, and duration are also defined in the Environmental Consequences section.

Table 2. Potential Long-Term Impacts

IMPACT TOPICS	ALTERNATIVE A (No action)	ALTERNATIVE B (Preferred)
Soils and Vegetation	Potentially minor to moderate adverse impacts	Permanent impacts to 18 acres; Potentially long-term beneficial effects
Wildlife and Wildlife Habitat	No impacts	Minor adverse impacts to wildlife habitat and wildlife; Beneficial effects
Special Status Species	No impacts	No long-term impacts
Water Resources	No impacts	No long-term impacts
Air Quality	No impacts	Beneficial effects
Soundscapes	No impacts	No long-term impacts
Cultural Resources	No impacts	No long-term impacts
Visual Resources	Potentially minor adverse impacts	Minor adverse impacts; Some beneficial effects
Public Safety and Visitor Experience	Moderate to major adverse impacts	Long-term beneficial effects
Park Operations	No effects	Minor adverse impacts due to increased patrols and maintenance activities

Page left intentionally blank.

SECTION III: AFFECTED ENVIRONMENT

INTRODUCTION

This section provides a description of the existing environment in the project area and the resources that could be affected by implementing the proposed alternatives. Complete and detailed descriptions of the environment and existing use at Lake Mead NRA is found in the *Lake Mead NRA Resource Management Plan* (NPS 1986), the *Lake Mead NRA General Management Plan* (NPS 1986), the *Lake Mead NRA Lake Management Plan* (NPS 2002), and on the Park website at www.nps.gov/lame.

LOCATION AND GENERAL DESCRIPTION OF LAKE MEAD NRA AND THE PROJECT AREA

Lake Mead NRA was designated as the first National Recreation Area in 1964. Lake Mead is located in southern Nevada and northwestern Arizona, about 20 miles southeast of Las Vegas, Nevada, and about 5 miles north of Bullhead City, Arizona, and Laughlin, Nevada (Figure 1). It consists of two large reservoirs (Lakes Mead and Mohave) formed by the Colorado River. The recreation area is approximately 1.5 million acres in size, with about 87% of that acreage being terrestrial resources. About 60% of the total acreage is within the state of Arizona, in Mohave County, and 40% of the total acreage is in the state of Nevada, in Clark County.

Lake Mead NRA users include boaters, swimmers, fishermen, hikers, photographers, roadside sightseers, backpackers, campers, and bicyclists. Recreation visits in 2002 totaled just over 7.8 million (NPS 2002). The majority of park visitation occurs during the summer months and involves water-based recreation. However, visitation is increasing in the spring and fall as visitors discover the backcountry regions of the recreation area through hiking and travel on the approved road system.

The project area is located in the western portion of the recreation area, near Lake Mead, in the vicinity of the Boulder Basin developed area (Figure 1). Boulder Basin is one of the closest developed recreation areas to the cities of Boulder City and Henderson. It serves as a primary recreational access point to the recreation area for residents and visitors to the Las Vegas Valley area. In 2002, visitors entering the park from the Lake Mead Drive entrance station was approximately 1.8 million and 2.0 million from the Boulder Beach entrance station (NPS 2002).

The trail portion within Lake Mead NRA would stretch from the Lake Mead Drive entrance station, near the park boundary with the City of Henderson and the Lake Las Vegas community, and continue in close proximity to Lakeshore Road, primarily following existing right-of-way corridors, paved areas, and trails, to the Pacifica Way Trailhead. The trail would become part of the 35-mile River Mountains Loop Trail, which would encircle the River Mountains and connect Lake Mead NRA to Hoover Dam, Boulder City, Henderson, and the rest of the Las Vegas Valley.

Available facilities in the Boulder Basin area include two concession-operated restaurants and stores, a concession-operated ferry service, overlooks with parking and picnic facilities, campgrounds, an employee housing area, facilities used by the Nevada Division of Fish and Wildlife and the Southern Nevada Water Authority, a concession-operated trailer village, and the Alan Bible Visitor Center.

Natural Resources

The project area is characteristic of the Mojave Desert, with low precipitation (averaging 8 to 23 centimeters per year [3 to 9 inches per year]), low humidity, and wide extremes in daily temperatures. Winters are relatively short and mild, and summers are long and hot. The prevailing wind direction is from the south during the summer, and from the north during the winter.

Geology, Topography, and Soils

The western portion of Lake Mead NRA is characterized by generally north-south trending mountain ranges separated by broad, shallow valleys. The River Mountains run along the western boundary of Lake Mead NRA west of Lakeshore Road. The mountains are dissected by deep ravines opening into broad alluvial fans. Adjoining fans commonly coalesce and form a continuous alluvial apron along the base of the mountains. These slopes extend eastward where they merge with the shoreline of Lake Mead. The underlying strata of these slopes consists chiefly of Tertiary and Quaternary deposits.

Vegetation

Creosotebush and white bursage shrubland community dominate the project area, and occur in sandy, gravelly soil. Gypsiferous soils are also present in a portion of the project area, and are classified as Gypsum barren, and is potential bearpoppy habitat. It is located within the known range of the Las Vegas bearpoppy. Less than ½-mile from the proposed trail is an area classified as a dormant bearpoppy site which a historical record of bearpoppies exists (Powell and Bangle 2003).

The Boulder Beach and Las Vegas Bay developed areas located along the lakeshore are also in the creosote bush community. However, there are dramatic differences between the vegetation in the developed areas and the native vegetation that surrounds them. The vegetation in the developed areas consists of an intermingling of natural vegetation, manicured lawns, oleanders, fan palms, flower gardens, and other exotic species. Roads and utility corridors have also altered the natural vegetation and wildlife habitat. This is particularly evident along Lakeshore Road in the areas of steep cuts and fills.

Water Resources

The project area roughly parallels Lake Mead, the primary water resource in the region. The proposed trail corridor crosses numerous washes that empty into the lake. These washes are typically dry, although they are subject to seasonal flash flooding, primarily in the late summer and early fall months. Trail crossings of the washes consist of large diameter culverts and at-grade crossings. Boulder Beach is on a broad alluvial fan with flood protection provided by dikes. Flooding in this area can concentrate unpredictably in localized flows, but more often takes the form of shallow sheet flows up to 2 feet deep.

This flood hazard is low compared to all other areas in the recreation area with flood hazards. The GMP proposed dikes to protect the development on this alluvial fan. The flood hazard at Las Vegas Wash exists only along the southern edge of the developed area that includes the boat launch ramp and dry boat storage.

Basic Management Inc. Waterline. The 13-mile long waterline is part of the water supply system that delivers water from Lake Mead to an industrial complex in Henderson. Approximately 3 miles of the waterline owned and operated by BMI run under a section of Lakeshore Road in Lake Mead NRA.

Wildlife

Common mammals that may occur along the proposed trail route include the desert cottontail (*Sylvialagus audubonii*); black-tailed jackrabbit (*Lepus californicus*); Merriam's, Ord's, and desert kangaroo rats (*Dipodomys merriami, D. ordii*, and *D. deserti*); Harris and white-tailed antelope squirrels(*Ammospermophilus harrisii* and *A.* leucurus); little, Arizona, long-tailed, desert, rock, and spiny pocket mice (*Perognathus longimembris, P. amplus, P. formosus, P. penicllatus, P. intermedius,* and *P. spinatus*); cactus mouse(*Peromyscus eremicus*); coyote (*Canis latrans*), and kit fox (*Vulpes macrotis*). Desert bighorn sheep (*Ovis canadensis*)are relatively common in the rugged terrain of the neighboring River Mountains, but are only rarely seen in the lower elevations near Lakeshore Road. The River Mountain herd is very productive and often used by the Nevada Department of Wildlife to enhance other herds in Nevada by transplanting individuals.

Reptile species most likely to occur in the desert environment of the proposed trail corridor include the western banded gecko (*Coleonyx variegatus*), desert iguana (*Dipsosaurus dorsalis*), zebra-tailed lizard (*Callisaurus draconides*), collared lizard (*Crotaphytus collaris*), leopard lizard (*Crotaphytus wislizeni*), side-blotched lizard (*Uta stansburiana*), desert horned lizard (*Phrynosoma platyrhinos*), and western whiptail (*Cnemidophorus tigris*). Nocturnal snakes are also commonly found in the project area.

Amphibian species would be more common nearer to Lake Mead and the irrigated landscaping near the campgrounds, trailer village, and marinas. The desert toad (*Bufo punctatus*), Woodhouse's toad (*B. woodhousei*), leopard frog (*Rana pipiens*), and bullfrog (*R. catesbeiana*) would be the most common amphibians expected for the project area.

Special Status Species

Species of concern that could be found in the project area include: chuckwalla (*Sauromalus ater*), banded Gila monster (*Heloderma suspectum cinctum*), western burrowing owl (*Athene cunicularia hypugea*), desert bighorn sheep (*Ovis canadensis nelsoni*), and the Las Vegas bearpoppy (*Arctomecon californica*).

The NPS consulted the most recent listing of Endangered, Threatened, and Candidate Species prepared by the USFWS (Appendix C). Species included in their response that inhabit the project area include desert tortoise (*Gopherus agassizii*).

Desert Tortoise. The desert tortoise, Mojave population, is a federally-listed threatened species. The state of Nevada classifies the desert tortoise as protected and rare outside the urban areas of Clark County (Las Vegas). The Mojave population is found to the west and north of the Colorado River and is subdivided into two subpopulations, western and eastern. Lakeshore Road is within the area occupied by the eastern Mojave subpopulation, which includes tortoises in eastern California, southern Nevada, and the Beaver Dam slope and Virgin River Basin of southwestern Utah and extreme northwestern Arizona (north of the Colorado River). Eastern Mojave tortoises are found in creosotebush, burrobush (*Ambrosia dumosa*), and creosotebush/ Joshua tree (*Yucca brevifolia*) vegetation types. The Mojave population of the desert tortoise is threatened by loss and degradation of habitat due to construction activities (roads, pipelines, powerline, housing developments, energy developments, etc.), mining, grazing, and off-road vehicle use. A recently identified upper respiratory disease, predation of juveniles by common ravens, illegal collection, and vandalism also are threats to the population. Tortoise populations are probably dependent on relatively rare years of sufficient forage for reproduction and survival. Tortoises are generally active in the spring and fall when annual plants are most abundant, and they must consume their forage requirement during this active period. Tortoises usually spend the remainder of the year in burrows or dens, out of the extreme weather conditions of the desert. Burrows may be under or between bushes, in the banks or beds of washes, in rock outcrops, or in caliche caves.

Air Quality

Under the Clean Air Act Amendments of 1990, the US Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for six "criteria pollutants": lead, ozone, sulfur dioxide, oxides of nitrogen, carbon monoxide (CO), and particulate matter smaller than 10 microns in diameter (PM10). Based on air quality monitoring data, a portion of Clark County (Las Vegas planning area's Hydrographic Basin 212) has been designed as being in serious non-attainment with the NAAQS for MP10 and CO (EPA 2001). The project area is not located within the non-attainment boundary.

The Nevada Division of Environmental Protection, Bureau of Air Quality has air quality jurisdiction over all counties in Nevada, except for Washoe and Clark counties, which have their own distinct jurisdictions. The Air Quality Division of the Clark County Health District is the regulatory and enforcement agency for air quality matters in Clark County.

The NPS, Air Resources Division and USFWS, Air Quality Branch together have responsibility for approximately 378 park units and 503 refuges, for which the Clean Air Act designates Class I and Class II air quality area. Class I includes the following areas that were in existence as of August 7, 1977; national parks over 2,428 hectares (6,000 acres), national wilderness areas and national memorial parks over 2,024 hectares (5,000 acres), and international parks. Class II areas are parts of the country protected under the Clean Air Act but identified for somewhat less stringent protection from air pollution damage than a Class I area, except in specified cases (NPS 2001). Lake Mead NRA is designated as a Class II air quality area, and air quality in the region is generally good.

Most reductions in air quality are due to air flows from the Las Vegas Valley west of Lake Mead NRA (NPS 2001).

Soundscapes

Noise-sensitive receptors are those locations where activities that could be affected by increased noise levels occur and include locations such as residences, motels, churches, schools, parks, and libraries. Existing noise levels are determined for the outdoor living area at sensitive receptors. There are no sensitive receptors in the project area, other than Lake Mead NRA. The dominant noise source in the project area is automobile and truck traffic on Lakeshore and Northshore Roads and Highway 93, and motorized vessel traffic on Lake Mead.

Cultural Resources

Historic Overview: Prehistory

Archeologists have identified a series of Native American cultures that have occupied Lake Mead NRA and adjacent areas in southern Nevada and Western Arizona over the last 12,000 to 13,000 years. These cultures have been divided into discrete time periods based on various criteria, i.e. changes in technology, the types of animal and plant foods used, or the migration of peoples into and out of the area.

Occupation of the area began at the end of the late Pleistocene around 12,000 to 13,000 years ago with the Paleoindian period. The Paleoindian period lasted into the Holocene and ended around 7,000 before present (BP). The Pleistocene was dominated by greater rainfall and moderate temperatures, which created an environment of vast lakes and humid conditions. During the Paleoindian period of the early Holocene, the environment was characterized by a general trend to warmer and dryer conditions. Paleoindian peoples lived in small, highly nomadic groups, utilized wild plant foods, and hunted now extinct big game. Physical remains from the Paleoindian period usually consist of flaked stone tools and the by-products of tool manufacture, e.g. flakes and spent cores.

The Archaic period (7,000 to 2,000 BP) is characterized by nomadic peoples living in small groups adapted to the mosaic of microenvironments created by the overall warmer and dryer conditions. Their subsistence was based on gathering wild plant foods and hunting small game. Flaked stone tools and the by-products of tool manufacture, along with the common occurrence of ground stone artifacts, typify the Archaic period.

The arrival of Anasazi peoples from the east marked the end of the Archaic period and the beginning of the Saratoga Springs period. The Saratoga Springs period (2,000 to 750 BP) was dominated by the expansion of the Virgin Anasazi into the Lake Mead area, and their eventual withdrawal. The Virgin Anasazi were Puebloan peoples who used pottery and lived in permanent structures. The practiced some horticulture but still depended heavily on wild plant and animal foods.

The Late Prehistoric lifeway , which began around 750 BP, was similar to Archaic adaptations. The people lived in small mobile groups, gathered wild plant foods, and

hunted small game. They also practiced small scale horticulture. Archeologically, these people are indistinguishable from the Mojave, Quechan, Hualapai, and Havasupai (Yuman-speaking peoples) and the Southern Paiute (Numic-speaking peoples) who occupied the area during the Historic period.

Euro-American History

The Spanish and later the Mexicans were the first whites to explore the area. During the Spanish/Mexican period (1500s to 1840s) trade routes were established between the population centers in New Mexico and the colonies in California. These trade routes included the Mojave Trail and the Old Spanish Trail, which passed through Southern Nevada.

The Mormons were the first to establish permanent white settlements in Southern Nevada. These included Las Vegas, St. Thomas, and Callville, the latter two of which were inundated by Lake Mead. During the late 1800s and early 1900s, the prosperity of these communities and others in the area was determined by the boom and bust cycles of the mining and ranching industries that formed the economic base of the area.

The construction of Hoover Dam in the 1930s dramatically changed the landscape of southern Nevada and Western Arizona. It brought thousands of people to the area, put Las Vegas on the map, and helped develop the area's current economy based on recreation and tourism.

Results of Cultural Resource Inventory

The project area was inventoried for cultural resources. Several historic structures were located within the APE. These include: sections of the U.S. Construction Railroad and Six Companies Railroad grades (26CK4046a and b); sections of the historic Lakeshore Road (26CK5383); and a section of the historic Basin Magnesium aqueduct access road (26CK6755) and power line (26CK6756). No other cultural resources were found within the APE (Daron 2003).

Socioeconomic Resources, Visitor Use, and Park Operations

Tourism is an important component of the region surrounding Lake Mead NRA, and much of the tourism revolves around the gaming industry. The recreation area provides a valuable resource to the area, contributing to the local economy through the sale and rental of boats and other water-related equipment, and other recreational equipment and services. It is estimated that the total annual impact of the recreation area on the gateway communities in the region is in the millions of dollars.

SECTION IV: ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This section presents the likely beneficial and adverse effects to the natural and human environment that would result from implementing the alternatives under consideration. This section describes short-term and long-term effects, direct and indirect effects, cumulative effects, and the potential for each alternative to impair park resources. Interpretation of impacts in terms of their duration, intensity (or magnitude), and context (local, regional, or national effects) are provided where possible.

METHODOLOGY

This section contains the environmental impacts, including direct and indirect effects and their significance to the alternatives. It also assumes that the mitigation identified in the *Mitigation and Monitoring* section of this EA would be implemented under the action alternative.

Impact analyses and conclusions are based on NPS staff knowledge of resources and the project area, review of existing literature, and information provided by experts in the NPS or other agencies. Any impacts described in this section are based on preliminary design of the alternatives under consideration. Effects are quantified where possible; in the absence of quantitative data, best professional judgment prevailed.

CRITERIA AND THRESHOLDS FOR IMPACT ANALYSES

The following are laws, regulations, and/ or guidance that relates to the evaluation of each impact topic.

Soils and Vegetation

Laws, Regulations, and Policies. NPS Management Policies (4.8) stipulates that the NPS will preserve and protect geologic resources as integral components of park natural systems. Geologic resources includes geologic features and geologic processes. The fundamental policy, as stated in the NPS Natural Resources Management Guideline (NPS-77) is the preservation of the geologic resources of parks in their natural condition whenever possible.

Soil resources would be protected by preventing or minimizing adverse potentially irreversible impacts on soils, in accordance with NPS Management Policies. NPS-77 specified objectives for each management zone for soil resources management. These management objectives are defined as: (1) natural zone- preserve natural soils and the processes of soil genesis in a condition undisturbed by humans; (2) cultural zone- conserve soil resources to the extent possible consistent with maintenance of the historic and cultural scene and prevent soil erosion wherever possible; (3) park development zone- ensure that developments and their management are consistent with soil limitations and soil conservation practices; and, (4) special use zone- minimize soil loss and

disturbance caused by special use activities, and ensure that soils retain their productivity and potential for reclamation.

Zones within the recreation area have been designated in the Lake Mead NRA General Management Plan, which provides the overall guidance and management direction for Lake Mead NRA.

The NPS Organic Act directs the park to conserve the scenery and the natural objects unimpaired for future generations. NPS *Management Policies* defines the general principles for managing biological resources as maintaining all native plants and animals as part of the natural ecosystem. When NPS management actions cause native vegetation to be removed, then the NPS will seek to ensure that such removals will not cause unacceptable impacts to native resource, natural process, or other park resources.

Exotic species, also referred to as non-native or alien, are not a natural component of the ecosystem. They are managed, up to and including eradication, under the criteria specified in *Management Policies* and *NPS-77*.

Impact Indicators, Criteria, and Methodology. The following impact thresholds were established for the project area.

- *Negligible impacts*: Impacts have no measurable or perceptible changes in soil structure and occur in a relatively small area. Impacts have no measurable or perceptible changes in plant community size, integrity, or continuity.

- *Minor impacts*: Impacts are measurable or perceptible, but localized in a relatively small area. The overall soil structure would not be affected. Impacts are measurable or perceptible and localized within a relatively small area. The overall viability of the plant community would not be affected and, if left alone, would recover.

- *Moderate impacts*: Impacts would be localized and small in size, but would cause a permanent change in the soil structure in that particular area. Impacts would cause a change in the plant community (e.g. abundance, distribution, quantity, or quality); however, the impact would remain localized.

- *Major impacts*: Impact to the soil structure would be substantial, highly noticeable, and permanent. Impacts to the plant community would be substantial, highly noticeable, and permanent.

- *Impairment*: For this analysis, impairment is considered a permanent change in a large portion of the overall acreage of the park. The impact would contribute substantially to the deterioration of the park's native vegetation. These resources would be affected over the long-term to the point that the park's purpose (Enabling Legislation, *General Management Plan, Strategic*

Plan) could not be fulfilled and resources could not be experienced and enjoyed by future generations.

Wildlife and Wildlife Habitat

Laws, Regulations, and Policies. The NPS Organic Act, which directs parks to conserve wildlife unimpaired for future generations, is interpreted by the NPS to mean native animal life should be protected and perpetuated as part of the recreation area's natural ecosystem. Natural processes are relied on to control populations of native species to the greatest extent possible. The restoration of native species is a high priority. Management goals for wildlife include maintaining components and processes of naturally evolving park ecosystems, including natural abundance, diversity, and ecological integrity of plants and animals.

The recreation area also manages and monitors wildlife cooperatively with the Arizona Game and Fish department and the Nevada Department of Wildlife.

Impact Indicators, Criteria, and Methodology. The impacts of wildlife were evaluated in terms of impacts to individual animals and wildlife habitat. Specific localized impacts were estimated based on knowledge garnered from similar past activities.

The following are standards used by the NPS in interpreting the level of impact to wildlife:

- *Negligible impacts*: No species of concern is present; no impacts or impacts with only temporary effects are expected.

- *Minor impacts*: Nonbreeding animals of concern are present, but only in low numbers. Habitat is not critical for survival; other habitat is available nearby. Occasional flight responses by wildlife are expected, but without interference with feeding, reproduction, or other activities necessary for survival.

- *Moderate impacts*: Breeding animals of concern are present; animals are present during particularly vulnerable life-stages, such as migration or winter; mortality or interference with activities necessary for survival expected on an occasional basis, but not expected to threaten the continued existence of the species in the park.

- *Major impacts*: Breeding animals are present in relatively high numbers, and/or wildlife is present during particularly vulnerable life stages. Habitat targeted by actions has a history of use by wildlife during critical periods, but there is suitable habitat for use nearby. Few incidents of mortality could occur, but the continued survival of the species is not at risk.

- *Impairment*: The impact would contribute substantially to the deterioration of natural resources to the extent that the park's wildlife and habitat would no

longer function as a natural system. Wildlife and its habitat would be affected over the long-term to the point that the park's purpose (Enabling Legislation, *General Management Plan, Strategic Plan*) could not be fulfilled and resource could not be experienced and enjoyed by future generations.

Threatened and Endangered Species

Laws, Regulations, and Policies. Section 7 of the Endangered Species Act mandates all federal agencies determine how to use their existing authorities to further the purposes of the Act to aid in recovering listed species, and to address existing and potential conservation issues. Section 7(a)(2) states that each federal agency shall, in consultation with the Secretary of the Interior, insure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat.

Management Policies directs the parks to survey for, protect, and strive to recover all species native to National Park System units that are listed under the Endangered Species Act (4.4.2.3). It sets the direction to meet the obligations of the Act. *Management Policies* also directs the NPS to inventory, monitor, and manage state and locally listed species, and other native species that are of special management concern to the parks, to maintain their natural distribution and abundance.

The *General Management Plan* designated 1,050,030 acres, or 70% of the NRA, as natural zones, and areas with known habitat or potential habitat for rare, threatened, or endangered species were further protected by placement in the environmental protection or outstanding natural feature subzone of the natural zone. Management of these zones focuses on the maintenance of isolation and natural process, and restoration of natural resources.

Impact Indicators, Criteria, and Methodology. The Endangered Species Act defines the terminology used to assess impacts to listed species as follows:

- *No effect*: The appropriate conclusion when the action agency determines that its proposed action would not affect a listed species or designated critical habitat.

- *Is not likely to adversely affect*: The appropriate conclusion when effects on listed species are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur. Based on the best judgement, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur.

- *Is likely to adversely affect:* The appropriate finding if any adverse effect to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not: discountable, insignificant, or beneficial. In the effect the overall effect of the proposed action is beneficial to the listed species, but is also likely to cause some adverse effects, then the proposed action "is likely to adversely affect" the listed species. If incidental take is anticipated to occur as a result of the proposed action, an "is likely to adversely affect" determination should be made.

- *Is likely to jeopardize proposed species/adversely modify proposed critical habitat – (Impairment):* The appropriate conclusion when the action agency or the U.S. Fish and Wildlife Service identify situations in which the proposed action is likely to jeopardize the continued existence of a proposed species or adversely modify the proposed critical habitat.

Air Quality

Laws, Regulations, and Policies. Air pollution sources within parks must comply with all federal, state, and local regulations. The regulations and policies that govern pollutants of concern are discussed briefly below.

Lake Mead NRA is designated as a Class II Air Quality area under the Clean Air Act. The main purpose of this act is to protect and enhance the nation's air quality to promote the public health and welfare. The act establishes specific programs to provide protection for air resources and values, including the program to prevent significant deterioration of air quality in clean air regions of the country. Although Lake Mead NRA is designated as a Class II Air Quality area, the park strives to maintain the highest air quality standards, and project work within the recreation area is completed in accordance with regional standards. However, the recreation area does not possess sufficient autonomous authority to address issues of air quality improvements when air pollution originates outside the boundaries.

NPS *Management Policies* direct parks to seek to perpetuate the best possible air quality to preserve natural and cultural resources, sustain visitor enjoyment, human health, and preserve scenic vistas (4.7). Parks are directed to comply with all federal, state, and local air quality regulations and permitting requirements. In cases of doubt as to the impacts of existing or potential air pollution on park resources, the NPS "will err on the side of protecting air quality and related values for future generations."

Impact Indicators, Criteria, and Methodology. Information from the literature was used to assess probable impacts to air quality. There are four impact categories relevant to air quality issues: negligible, minor, moderate and major. Each category is discussed below relative to potential airborne pollution impacts from the alternatives on park resources and human health.

- *Negligible impacts*: There is no smell of exhaust and no visible smoke. Dust from construction activities can be controlled by mitigation.

- *Minor impacts*: There is a slight smell of exhaust and smoke is visible during brief periods of time. Dust from use of dirt roads is visible during brief periods. Dust from construction activities is visible only during the work period, but most can be controlled by mitigation.

- *Moderate impacts*: There is a smell of gasoline fumes and exhaust in high-use areas. Smoke is visible during periods of high use. Dust from the use of dirt roads is visible for an extended area. Dust from construction activities is visible for an extended area for an extended period, but is reduced by mitigation.

- *Major impacts*: Smoke and gasoline fumes are easily detectable for extended periods of time in a large area. Dust from the use of dirt roads and construction activities is visible for an extended period for an extended amount of time, and mitigation is unable to alleviate the conditions.

Cultural Resources

Laws, Regulations, and Policies. Numerous legislative acts, regulations, and NPS policies provide direction for the protection, preservation, and management of cultural resources on public lands. Further, these laws and policies establish what must be considered in general management planning and how cultural resources must be managed in future undertakings resulting from the approved plan regardless of the final alternative chosen. Applicable laws and regulations include the NPS Organic Act (1916), the Antiquities Act of 1906, the National Historic Preservation Act of 1966 (1992, as amended), the National Environmental Policy Act of 1969, the National Parks and Recreation Act of 1978, the Archeological Resources Protection Act of 1979, the Native American Graves Protection and Repatriation Act of 1990, and the Curation of Federally Owned and Administered Archeological Collections (1991).

Applicable agency policies relevant to cultural resources include Chapter 5 of NPS *Management Policies*, and the *Cultural Resource Management Guideline (DO-28)*, as well as other related policy directives such as the NPS *Museum Handbook*, the NPS *Manual for Museums*, and *Interpretation and Visitor Services Guidelines (NPS-26).*

The Antiquities Act of 1906 (P.L. 209) authorized the president to establish historic landmarks and structures as monuments owned or controlled by the U.S. government and instituted a fine for unauthorized collection of their artifacts.

The NPS Organic Act (16 USC 1-4) established the agency to manage the parks and monuments with the purpose of conserving historic objects within them and providing for their enjoyment.

The National Historic Preservation Act of 1966 (NHPA; 16 USC 470, et seq.) requires in section 106 that federal agencies with direct or indirect jurisdiction over undertakings take into account the effect of those undertakings on properties that are listed on, or eligible for listing on, the National Register of Historic Places. Section 110 of the act further requires federal land managers to establish programs in consultation with the state historic preservation office to identify, evaluate, and nominate properties to the national register. This act applies to all federal undertakings or projects requiring federal funds or permits.

The National Environmental Policy Act of 1969 (NEPA; P.L. 91-190) sets forth federal policy to preserve important historic, cultural, and natural aspects of our national heritage and accomplishes this by assisting federal managers in making sound decisions based on an objective understanding of the potential environmental consequences of proposed management alternatives. This act applies to any federal project or other project requiring federal funding or licensing. This act requires federal agencies to use a systematic, interdisciplinary approach integrating natural and social sciences to identify and objectively evaluate all reasonable alternatives to a proposed action.

The National Parks and Recreation Act of 1978 (P.L. 95-625) requires that general management plans be developed for each unit in the national park system and that they include, among other things, measures for the preservation for the area's resources and an indication of the types and intensities of development associated with public use of a given unit.

The Archeological Resources Protection Act of 1979 (16 USC 470aa-mm) further codifies the federal government's efforts to protect and preserve archeological resources on public lands by stiffening criminal penalties, as well as instituting civil penalties, for the unauthorized collection of artifacts. Additionally, it establishes a permit system for the excavation and removal of artifacts from public lands, including their final disposition, as well as confidentiality provisions for sensitive site location information where the release of such information may endanger the resource.

The Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001) sets forth procedures for determining the final disposition of any human remains, funerary objects, or objects of cultural patrimony that are discovered on public lands or during the course of a federal undertaking.

"The Curation of Federally Owned and Administered Archeological Collections" (36 CFR 79) establishes guidelines and procedures for the proper curation and management of archeological collections owned or administered by federal agencies.

Impact Indicators, Criteria, and Methodology. Impacts on cultural resources were developed based on existing conditions, current regulations, and likely development trends. The inventory of archaeological resources in the park is largely incomplete. For purposes of assessing impacts, all unrecorded resources are considered potentially eligible for listing on the National Register of Historic Places.

The park's inventory of standing structures and cultural landscapes is relatively complete, however, many structures and landscapes still require evaluation to determine their eligibility for listing on the National Register of Historic Places. For purposes of assessing potential impacts to these properties, unevaluated structures and landscapes are assumed to be potentially eligible.

Under Section 106 of the National Historic Preservation Act (NHPA), only historic resources that are eligible or are listed on the National Register of Historic Places are considered for impacts. An impact to a property occurs if a proposed action would alter in any way the characteristic that qualifies it for inclusion on the register.

Under the Advisory Council's regulations a determination of either *adverse effect* or *no adverse effect* must also be made for affected, National Register eligible cultural resources. An *adverse effect* occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualify it for inclusion in the National Register, e.g. diminishing the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association. Adverse effects also include reasonably foreseeable effects caused by the preferred alternative that would occur later in time, be farther removed in distance or be cumulative (36 CFR Part 800.5, *Assessment of Adverse Effects*). A determination of *no adverse effect* means there is an effect, but the effect would not diminish in any way the characteristics of the cultural resource that qualify it for inclusion in the National Register.

For the purposes of this document, the level of impacts to cultural resources was accomplished using the following criteria:

- *Negligible impacts*: No potentially eligible or listed properties are present; no direct or indirect impacts. For purposes of Section 106, the determination would be *no effect*.

- *Minor impacts*: Potentially eligible or listed properties are present; no direct impacts, i.e. no impacts that diminish the integrity of the property, or impacts with only temporary effects are expected. For purposes of Section 106, the determination would be *no adverse effect*.

- *Moderate impacts*: Potentially eligible or listed properties are present; indirect impacts or, in the case of structures, where activity is limited to rehabilitation conducted in a manner that preserves the historical and architectural value of the property. For purposes of Section 106, the determination would be *no adverse effect*.

- *Major impacts*: Potentially eligible or listed properties present; direct impacts including physical destruction, damage, or alteration of all or part of a property. Isolation of a property from or alteration of the character of a property's setting when that character contributes to its eligibility, including

removal from its historic location. Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting. Neglect of a property resulting in its deterioration or destruction (36 CFR 800.5). For purposes of Section 106, the determination would be *adverse effect*.

- *Impairment*: Loss, destruction, or degradation of a cultural property, resource, or value to the point that it negatively affects the park's purpose and visitor experience. For purposes of Section 106, the determination would be *adverse effect*.

In the absence of quantitative data concerning the full extent of actions under a proposed alternative, best professional judgement prevailed.

CRITERIA AND THRESHOLDS FOR IMPACT ANALYSES OF ALL OTHER ISSUES

Impacts to water resources, soundscapes, visual resources, public safety and visitor experience, and park operations were analyzed using the best available information and best professional judgment of park staff.

Terms referring to impact intensity, context, and duration are used in the effects analysis. Unless otherwise stated, the standard definitions for these terms are as follows:

- *Negligible impacts*: The impact is at the lower level of detection; there would be no measurable change.

- *Minor impacts*: The impact is slight but detectable; there would be a small change.

- *Moderate impacts*: The impact is readily apparent; there would be a measurable change that could result in a small but permanent change.

- *Major impacts*: The impact is severe; there would be a highly noticeable, permanent measurable change.

- *Localized Impact*: The impact occurs in a specific site or area. When comparing changes to existing conditions, the impacts are detectable only in the localized area.

- *Short-Term Effect*: The effect occurs only during or immediately after implementation of the alternative.

- *Long-Term Effect*: The effect could occur for an extended period after implementation of the alternative. The effect could last several years or more and could be beneficial or adverse.

IMPAIRMENT ANALYSIS

Impairment to park resources and values are analyzed in this section. Impairment is an impact that, in the professional judgement of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. An impact would be more likely to constitute an impairment to the extent that it affects a resource or value whose conservation is key to the cultural or natural integrity of the park or that is a resource or value needed to fulfill a specific purpose identified in the enabling legislation. An impact would be less likely to constitute an impairment is it is an unavoidable result that cannot be reasonably mitigated of an action necessary to preserve or restore the integrity of park resources or values.

A determination of impairment is made in the "Conclusion" section of all natural and cultural resource impact topics of this document. Impairment statements are not required for recreational values/visitor use and experience or safety-related topics.

Cumulative Effects

Cumulative effects are the direct and indirect effects of a proposed project alternative's incremental impacts when they are added to other past, present, and reasonably foreseeable actions, regardless of who carries out the action (40 CFR Part 1508.7). Guidance for implementing NEPA (Public Law 91-190, 1970) requires that federal agencies identify the temporal and geographic boundaries within which they will evaluate potential cumulative effects of an action and the specific past, present, and reasonably foreseeable projects that will be analyzed. This includes potential actions within and outside the recreation area boundary. The geographical boundaries of analysis vary depending on the impact topic and potential effects. While this information may be inexact at this time, major sources of impacts have been assessed as accurately and completely as possible, using all available data.

Specific projects or ongoing activities with the potential to cumulatively affect the resources (impact topics) evaluated for the project are identified below. Some impact topics would be affected by several or all of the described activities, while others could be affected very little or not at all. How each alternative would incrementally contribute to potential impacts for a resource is included in the cumulative effects discussion for each impact topic.

Population growth in the Las Vegas Valley area, and increases in area visitation is considered when analyzing the cumulative impacts of the proposed alternatives. The Las Vegas Valley was developed in conjunction with the railroads in the early 1900s. The establishment of legalized gambling in 1910, construction of the Hoover Dam in 1935, and World War II continued to promote urban growth. During the 1930s, Las Vegas was a small railroad town with a population of just over 5,000. By 1960, Las Vegas'

population was over 64,000 (Clark County's was 127,000), and by 1980 it was approximately 164,000 (Clark County's was 463,000). Starting in the mid-1980s, annual population increases averaging nearly seven percent caused Las Vegas' population to almost double between 1985 and 1995, increasing from about 186,000 to 368,000, a 97.6 percent increase. At the same time, Clark County's population increased from 562,000 to 1,036,000, an increase of 84.3 percent. The July 2000 population estimate for Las Vegas was 482,874. The latest population prediction in the Las Vegas Valley is for two million people by 2005.

With the predicted increases in population in the local area, and continuing visitation from California and Arizona, park visitation will likely increase above the current 8 to 10 million visitors per year. The project area is located in the Boulder Basin area of the park, the busiest developed area of the recreation area. Visitation to the Boulder Basin area of the park in 2002 was just over 5 million (NPS 2002).

Human activities within the recreation area such as the construction, rehabilitation and maintenance of existing roads, parking lots, buildings, recreational facilities, and utility corridors have disturbed park resources in the past. In the Boulder Basin area, there are numerous roads, utility corridors, parking lots, fence corridors, recreational facilities and buildings. Ongoing maintenance activities, such as road grading, can result in negligible impacts to park resources since the activities are confined to existing roads. Known future development in the Boulder Basin area includes construction of a water safety center and the expansion of Nevada Department of Wildlife (NDOW) facilities. Resources in the Boulder Basin area have been previously impacted from park activities, as well as activities by concessioners, the Southern Nevada Water Authority (SNWA), and NDOW. The western portion of Lake Mead NRA is bordered by Boulder City, Henderson, and the community of Lake Las Vegas. Development on these adjacent lands has increased and therefore have encroached upon the Lake Mead NRA park boundary, and have increased visitation to the park.

Human activities can disturb park resources presently and in the future. Illegal activities, such as illegal off-road vehicle use, can damage park resources, such as soils, vegetation, and cultural sites, and can promote nonnative plant growth. The use of motorized vessels, including boats and personal watercraft, and park overflights, can impact the natural quiet and park soundscapes. Because the River Mountains Loop Trail would be located in an urban setting, there is an expectation of human-caused noise by the visitor.

Activities outside the recreation area are also considered when determining cumulative impacts. The River Mountains Loop Trail will be constructed to the recreation area boundary regardless of the decision made with the completion of this environmental assessment. Therefore desert resources would be impacted through habitat disturbance and increased visitor use. In addition to the trail, there are numerous powerline corridors adjacent to the recreation area and plans are being developed to add additional lines in the future. These corridors also contribute to cumulative impacts to desert resources.

ALTERNATIVE A- NO ACTION

Soils and Vegetation

Alternative A would result in no change and no impacts to the vegetation in the project area, since no trail construction would occur under this alternative.

Cumulative Effects: Since trail development is occurring adjacent to the recreation area the likelihood exists that some trail users would continue into the recreation area. This could lead to a disturbance of fragile desert soils, such as the gypsum soils, from trampling and impact special status species, including Las Vegas bearpoppies. Bicyclists could potentially travel into the recreation area from the adjacent trail. The use of non-designated bicycle corridors could damage soils and vegetation. Equestrian use from the River Mountains Loop Trail could come into the park. Horse use on a non-designated trail could trample vegetation and disturb soils. Horse droppings, and other ground disturbance could cause the spread of exotic vegetation. Disturbance to desert soils could lead to increased erosion in localized areas. Much of the recreation area land adjacent to the trail is in a previously disturbed corridor, therefore this impact would be minor to moderate.

There could be cumulative impacts to soils and vegetation resulting from the implementation of other park projects, illegal off-road vehicle use in the region, development occurring outside Lake Mead NRA, and the use of the River Mountains Loop Trail Adjacent to the recreation area.

Conclusion: There would be no direct impacts to soils and vegetation from not constructing the trail. However, there could be cumulative impacts. These impacts would be minor to moderate, considering the disturbed nature of the area, but are potentially long-term due to the potential for the spread of exotic vegetation. There would be no impairment to soils and vegetation as a result of the impacts associated with this alternative.

Wildlife and Wildlife Habitat

There would be no impact to wildlife and wildlife habitat from construction activities under this alternative because no construction would occur.

Cumulative Effects: There could be some disturbance to wildlife and wildlife habitat from trail users relative to trail use from the adjacent trail. This disturbance is associated with the presence of humans, bicycles, and horses, and this could cause a temporary, slight disturbance to wildlife. Because much of the area has been previously disturbed, the habitat is generally considered, by NPS biologists, to be low quality. Therefore loss of habitat from trail users would be negligible.

Conclusion: There would be no direct impacts to wildlife and wildlife habitat from construction activities. There would be negligible impacts due to disturbance associated with trail use on the adjacent trail, because only temporary effects are expected, including occasional flight responses and the habitat is not considered critical for survival. There

would be no impairment to wildlife and wildlife habitat as a result of the impacts associated with this alternative.

Special Status Species
Because no action would occur under this alternative, there would be no change in effects to the desert tortoise population in the project area. The existing roads, utility corridors, established trails, and facilities in the project area would continue to challenge tortoise movement.

Effects to the Las Vegas bearpoppy and its habitat are discussed in the soils and vegetation section.

Cumulative Effects: Desert tortoise would most likely remain unaffected, however, trampling of burrows by continued trail use in an undesignated area could occur. Equestrian use and other trail use in undesignated areas could cause ground disturbance leading to the introduction of nonnative species and an increase in erosion.

The project site occupies desert tortoise habitat and potential habitat for the chuckwalla, banded Gila monster, western burrowing owl, desert bighorn sheep, and Las Vegas bearpoppy. The development of private land in the vicinity of Las Vegas and its suburbs, and the associated loss and degradation of desert tortoise habitat and habitat for the species of concern is expected to continue into the future. Actions on private lands, such as urban development, recreation, and grazing, would continue to contribute to habitat degradation and loss for all biotic species.

The Service issues an incidental take permit pursuant to section 10(a)(1)(B) of the Endangered Species Act to Clark County and the cities of Las Vegas, North Las Vegas, Henderson, and Boulder City (24 July 1991). This permit authorized incidental take of desert tortoises on non-federal land in the permit boundaries. When reviewed within the regional expanse of Clark County and the geographical extent of the Mojave Desert habitat available for the desert tortoise population, the impact to desert tortoise along the proposed River Mountains Loop Trail corridor would be minimal. The cumulative effect of the no action alternative to the desert tortoise would be minimal relative to regional effects outside the recreation area, and would be long-term, negligible, and adverse. The cumulative effect of the no action alternative to species of concern would be long-term, negligible, and adverse relative to regional effects outside the recreation area.

Conclusion: The no action alternative would have no effect on Listed Species. There would be no impairment to special status species as a result of the impacts associated with the no action alternative.

Water Resources
Because no action would be taken under this alternative, there would be no change to direct or indirect impacts to water resources in the Boulder Basin area as a result of the no action alternative.

Cumulative Effects: Visitor use and facilities in the recreation contribute sediments and pollutants to Lake Mead. Maintenance to the Basic Management Inc. waterline would most likely be required in the future and would not be affected by the no action alternative. Other projects (including the *Lake Management Plan*, boat ramp improvements, and the *Systems Conveyance and Operations Program*) are planned, and these are likely to have both beneficial and adverse impacts on water quality. The no action alternative would not contribute to these actions.

Conclusion: The no action alternative would have no effect on water resources. There would be no impairment to water resources as a result of the impacts associated with the no action alternative.

Air Quality

Alternative A would result in no change and no impacts to air quality in the project area, since no trail construction would occur under this alternative.

Cumulative Effects: Increased traffic due to predicted increases in visitation could lead to an increase in vehicular emissions. The opportunity for the decrease in impacts to air quality from people accessing the park via the trail rather than from vehicles would not occur, because the trail would not be constructed under this alternative.

Conclusion: There would be no direct impacts to air quality from not constructing the trail. The opportunity for long-term beneficial effects to air quality resulting from visitors accessing the park via the trail rather than by vehicles would not occur. Cumulative impacts to air quality would continue as visitation to the park increases. Under this alternative, negligible impacts to air quality would occur, since it is uncertain how many people would actually utilize the trail. There would be no impairment to air quality as a result of the impacts associated with this alternative.

Soundscapes

There would be no change in existing conditions to the area soundscapes under this alternative. Traffic noises would continue to create negligible to minor impacts to the area soundscapes. There would be neither noise from construction activities nor from trail users, since no trail would be constructed under the no action alternative.

Cumulative Effects: Construction activities within the recreation area and on adjacent lands, including Lake Las Vegas, Boulder City, and Henderson impact soundscape quality. The soundscape is also impacted by air traffic from flights to Las Vegas and air tours to the Grand Canyon.

As traffic increases with the predicted increases in visitation, there would be increased noise in the Boulder Basin area. However, because the project area is located in a developed area, in an urban park setting, visitors have expectations of noise from traffic and motorized vessels on Lake Mead. In the long-term, noise from motorized vessels on Lake Mead could increase with the implementation of the *Lake Management Plan* that calls for the prohibition of two-stroke engines in 2012. Newer engine technology is

reported to be quieter, and this could reduce the impacts to the soundscape from boats and other motorized vessels in the future. Therefore, the cumulative impact over time to the soundscape in this area is negligible to minor.

Conclusion: There would be no direct impacts to soundscapes from not constructing the trail. There would be no impairment to soundscapes as a result of the impacts associated with this alternative.

Cultural Resources
Under the no action alternative, cultural resources would not be impacted because no new trail construction or construction of trailheads and kiosks would occur.

Cumulative Effects: Social paths and illegal off-road vehicle use could continue in this area and cultural resources could be damaged.

Conclusion: There would be no direct impacts to cultural resources from not constructing the trail, however there could be negative cumulative impacts from the creation of social trails and negative off-road vehicle use. There would be no impairment to cultural resources as a result of the impacts associated with this alternative.

Visual Resources
Under the no action alternative, visual resources would not be impacted from new trail construction or construction of trailheads and kiosks.

Cumulative Effects: Social paths and illegal off-road vehicle use could continue in this area and create minor negative visual disturbances.

Conclusion: There would be no direct impacts to visual resources from not constructing the trail though there could be some minor adverse cumulative impacts from the creation of social paths and illegal off-road vehicle use. There would be no impairment to visual resources as a result of the impacts associated with this alternative.

Public Safety and Visitor Experience
Under Alternative A, no trail would be constructed, and visitors may be discouraged to learn that an opportunity to construct a multi-use trail within Lake Mead NRA never commenced. Public safety would continue to be an issue due to the mixing of non-motorists and motorists on busy park roads. The River Mountains Loop Trail would not provide a path encircling the River Mountains, because the trail would not be constructed within Lake Mead NRA. Trail-users of the completed portions of the River Mountains Loop Trail, outside the Lake Mead NRA boundary, may continue into the park seeking alternative routes which would loop into the other endpoint of the completed trail. If no trail was constructed, the busy Lakeshore Road, which is currently unfit to accommodate bicyclists, hikers, etc., may actually invite more trail use which would create even more hazardous conditions on the road. This could exacerbate a goal of the River Mountains Loop Trail, which is to provide for a safe, alternative, transportation route. Current trail

users of the existing Historic Railroad Trail and Lakeshore Road Trail could be satisfied with the current trail conditions.

Cumulative Effects: Since the other segments of the trail would be constructed, visitors exploring recreational options may seek these opportunities outside of the park. The 35-mile River Mountains Loop Trail would terminate at the Lake Mead NRA boundary and 16 miles of trail would not be available for public use.

Conclusion: Not constructing the 16 miles of trail within Lake Mead NRA could have moderate to major negative affects on visitor use and experience, and public safety. Those who enjoy the existing trails at Lake Mead NRA could benefit by no trail improvements.

Park Operations
There would be no impacts to recreation area operations under this alternative. Maintenance would continue to maintain the existing roads and trails. If trail-users decided to continue their recreational activities onto undesignated trail areas in the park, this could lead to increased disturbance of resources and could demand assistance from enforcement officers, maintenance crews, restoration crews, and other park personnel.

Cumulative Effects: There would be no cumulative effects to park operations from the no action alternative.

Conclusion: There would be no impacts to park operations resulting from the no action alternative.

ALTERNATIVE B- PREFERRED ALTERNATIVE
Construct River Mountains Loop Trail Within Lake Mead NRA

Soils and Vegetation
The trail would impact approximately16 linear miles within the recreation area. The width of the trail would be 16 feet, 12 feet which would be paved with 2-foot unpaved shoulders. An additional 9 feet would be required for the 2-mile equestrian compatible segment extending from the Lake Mead Drive Entrance Station to Las Vegas Bay.

Of the 34 acres, approximately 24 acres have been previously disturbed. Approximately 18 acres of unpaved land would be paved under this alternative, resulting in a permanent change. The relatively short, intermittent segments of undisturbed habitat that would be utilized for trail construction are in close proximity to previously disturbed corridors. Construction of the trail in areas of no disturbance would result in approximately 10 acres of newly disturbed soils and vegetation. Approximately 70% of the trail would follow previously disturbed corridors and utilize previously disturbed land. Approximately 30% of the trail would require new land disturbance, mostly in the form of widening existing corridors. Because this project would occur in a highly developed area of the park and would utilize previously disturbed corridors, the impacts to soils would be minor.

Table 3. Impact Matrix Depicting Disturbance to Desert Tortoise Habitat

	Total Acreage Proposed for Trail Construction	**Existing Disturbance**	**New Disturbance**	**Proposed Paving of Unpaved Corridors**
Segment 17	7.27 acres	4.85 acres	2.42 acres	2.91 acres would be paved 1.21 acres would have a compacted surface
Segment 18	6.6 acres	6.6 acres	None	No new paving would occur.
Segment 19	4.27 acres	3.55 acres	0.72 acres	3.2 acres
Segment 20	1.55 acres	None- partially restored habitat	1.55 acres	1.16 acres
Segment 21	6.2 acres	1.16 acres	5.04 acres	4.65 acres
Segment 22	6.98 acres	6.98 acres	None	5.24 acres
Connector Trail- C8	1.02 acres	0.48 acre	0.54 acre	0.76 acre
Totals	33.89 acres	23.62 acres	10.27 acres	17.92 acres paved 1.21 acres compacted surface

Exotic plant species could invade the area disturbed from construction activities, and could become established in the 2-mile corridor of the trail designated to accommodate equestrian use. Mitigation and monitoring would reduce this impact to minor.

The trail would enter gypsum barren habitat that is potential Las Vegas bearpoppy habitat. The Las Vegas bearpoppy has not been recorded from the project area, however, it is close to a site on which bearpoppies have been known to historically occur. Trail users and horses who leave the trail in the bearpoppy habitat area could degrade the integrity of the habitat for these plants, or may pick flowers or destroy plants. Walking or riding horses on the gypsum barren will cause disturbance that cannot be repaired and creates the opportunity for rapid erosion and loss of fertility of the soils. There is a possibility that users of the trail may depart from the designated trail and disturb the soils and vegetation along the trail route. Mitigation, including kiosks and wayside exhibits would provide information and educate the visitor of the importance of the natural and cultural resources in the area and could reduce this impact to minor.

Having an established trail corridor may reduce the impacts visitors may have on the area from establishing multiple trail corridors, and in the long-term may actually benefit soils and vegetation in the area.

Cumulative Effects: The project area is located in a highly developed area of the park with numerous roads, facilities, and overlooks, and the majority of the trail would utilize previously disturbed corridors. The project area is also in close proximity to the communities of Lake Las Vegas, Henderson, Boulder City, and Las Vegas. Development outside Lake Mead NRA in the Las Vegas Valley has reduced natural desert area, rare plant habitat, including the Las Vegas bearpoppy, and has disturbed desert soils. Land in the project area and outside of the park have all-ready been compromised, and this project would not add to the long-term impacts to soils and vegetation. Trail

development occurring on land adjacent to the recreation area could impact special status species, including the gypsum soils potentially harboring Las Vegas bearpoppies.

Conclusion: There would be permanent impacts to soils and vegetation from paving 18 acres of land. Approximately 24 acres of the proposed trail location has been previously disturbed or is located in an existing road or right-of-way corridor, therefore impacts to soils and vegetation are considered minor. Having an established trail corridor may reduce the impacts visitors may have on the area from establishing multiple trail corridors, and in the long-term may actually benefit soils and vegetation in the area. There would be no impairment to soils and vegetation from the impacts associated with Alternative B.

Wildlife and Wildlife Habitat

Construction of the trail would result in a permanent change to approximately 34 acres (Table 3). Of this acreage, 24 acres has been previously disturbed (existing right-of-way corridors, paved areas, and trails). A total of 10.27 acres of previously undisturbed desert habitat would be permanently lost to construction. This habitat is located intermittently with previously disturbed habitat.

The disturbance associated with construction activities would temporarily disturb and displace wildlife from the area during the project work. Human-generated noise and recreational activities could disturb wildlife over a longer period. Some wildlife species would most likely seek new habitat in the surrounding area to avoid interaction with humans. Small mammals, birds, and lizards would return to the project area.

Kiosks and wayside exhibits would provide information to park visitors on the importance of preserving the desert environment. This education program could reduce impacts to wildlife and wildlife habitat. The impacts to wildlife and wildlife habitat are considered minor since the project would utilize low quality habitat located in a development zone, which has been previously disturbed.

Cumulative Effects: In-park projects and projects occurring outside the park disturb desert habitat. Projects occurring within Lake Mead NRA which affect habitat include Lakeshore Road, Northshore Road, the Nevada Department of Wildlife Fish Hatchery, the water treatment plant, marina activities, and the construction of parking lots and overlooks. Projects and development occurring on lands adjacent to Lake Mead NRA have contributed to the loss of habitat.

Conclusion: There would be minor, adverse impacts to wildlife and wildlife habitat from trail construction and trail use. There would be no impairment to wildlife and wildlife habitat as a result of the impacts associated with trail construction.

Special Status Species

Mitigation would protect special status species, such as the desert tortoise, from direct mortality. However, loss of habitat would occur, and tortoises could be moved from the project site during construction.

Construction of the trail would result in a permanent change to approximately 34 acres (Table 3). Of this acreage, 24 acres has been previously disturbed (existing right-of-way corridors, paved areas, and trails). A total of 10.27 acres of previously undisturbed desert habitat would be permanently lost to construction. This habitat is located intermittently with previously disturbed habitat. Conservation and mitigation measures would be implemented to protect the desert tortoise. Even with these measures, avoiding a "take" of this species can not be guaranteed. Therefore, the NPS has determined that this project may effect, and is likely to adversely affect, the desert tortoise. Formal consultation with U.S. Fish and Wildlife Service has been initiated.

Effects to the Las Vegas bearpoppy and its habitat are discussed in the soils and vegetation section.

Cumulative Effects: Desert tortoise would most likely remain unaffected, however, trampling of burrows by continued trail use in undesignated areas could occur. Equestrian use and other trail use in undesignated areas could cause ground disturbance leading to the introduction of nonnative species and an increase in erosion.

The project site occupies desert tortoise habitat and potential habitat for the chuckwalla, banded Gila monster, western burrowing owl, desert bighorn sheep, and Las Vegas bearpoppy. The development of private land in the vicinity of Las Vegas and its suburbs, and the associated loss and degradation of desert tortoise habitat and habitat for the species of concern is expected to continue into the future. Actions on private lands, such as urban development, recreation, and grazing, would continue to contribute to habitat degradation and loss for all biotic species.

The Service issues an incidental take permit pursuant to section 10(a)(1)(B) of the Endangered Species Act to Clark County and the cities of Las Vegas, North Las Vegas, Henderson, and Boulder City (24 July 1991). This permit authorized incidental take of desert tortoises on non-federal land in the permit boundaries. When reviewed within the regional expanse of Clark County and the geographical extent of the Mojave Desert habitat available for the desert tortoise population, the impact to desert tortoise along the proposed River Mountains Loop Trail corridor would be minimal. The cumulative effect from trail construction to the desert tortoise would be minimal relative to regional effects outside the recreation area, and would be long-term, negligible, and adverse. The cumulative effect associated with this alternative to species of concern would be long-term, negligible, and adverse relative to regional effects outside the recreation area.

Conclusion: The desert tortoise will likely be adversely affected by this project. Approximately 10 acres of previously undisturbed habitat would be lost, however, Lake Mead NRA provides thousands of acres of suitable habitat near the project site and throughout the recreation area, therefore no impairment would occur.

Water Resources
Best Management Practices (BMPs) for controlling nonpoint pollution during construction activities would be implemented and would help control sedimentation and erosion during small storm events. Depending on the extent to which storm events were avoided during construction, short-term, adverse impacts on water quality from increased erosion, sedimentation, and turbidity would range from negligible to minor.

Cumulative Effects: Visitor use and facilities in the recreation contribute sediments and pollutants to Lake Mead. Maintenance to the Basic Management Inc. waterline would most likely be required in the future. Other projects (including the *Lake Management Plan*, boat ramp improvements, and the *Systems Conveyance and Operations Program*) are planned, and these are likely to have both beneficial and adverse impacts on water quality.

Conclusion: Alternative B would result in short-term, adverse, negligible to minor impacts on water resources. There would be no impairment to water resources as a result of the impacts associated with this alternative.

Air Quality
There would be impacts associated from construction activities, including the use of heavy equipment, exhaust, and soil disturbance activities. Mitigation would be utilized to alleviate these impacts, therefore impacts are expected to be minor and temporary.

The trail would be approximately 16-feet wide, 12 feet of which would be paved and would not generate dust. Existing use of the utility corridor can generate dust on a localized basis. The paving of this surface would reduce the dust generated by the utility vehicles, creating a long-term beneficial impact on air quality. The surface of the 9-feet wide, 2 mile long equestrian compatible portion of the trail would have an improved natural surface, but could create dust from use. It is not expected that the trail will attract a multitude of equestrian riders.

Cumulative Effects: Air quality around Lake Mead is affected by a variety of internal and external sources, including powerplants, motor vehicle and vessel emissions, and dust from the use of backcountry roads. The project area is in close proximity to Las Vegas and Henderson, therefore regional air quality has all ready been compromised and this project would not add to the long-term impacts.

Conclusion: There would be minor, localized impacts to air quality during construction activities. The paving of this surface would reduce the dust generated by the utility vehicles, creating a long-term beneficial impact on air quality. No impairment to air quality would occur from implementation of this alternative.

Soundscapes
The project area is located in an urban park setting, and the public expects some level of human-generated noise. Existing noise sources include vehicle traffic, air traffic, and

motorized vessels. Construction noises would add to that existing level of noise, however, they would be minor and short-term, occurring only during construction.

Cumulative Effects: Human-generated noise occurs in the project area in the form of motorized vessel use, vehicular traffic, and air traffic. The Boulder Basin area of the park is highly developed and construction-related noise resonates from internal and external sources.

Conclusion: Under Alternative B, there would be minor, short-term increases in noise from construction activities during construction. Human-generated noise could increase as the trail could attract more visitors into the area however, the impacts are considered negligible because the project area is in a developed, urban location. No impairment to soundscapes would occur from implementation of this alternative.

Cultural Resources

As currently designed, the River Mountains Loop Trail would impact the following cultural resources: sections of the U.S. Construction Railroad and Six Companies Railroad grades (26CK4046a and b); sections of the historic Lakeshore Road (26CK5383); and a section of the historic Basic Magnesium aqueduct and access road (26CK6755) and power line (26CK6756). Sections of the trail would be built adjacent to and on portions of the U.S. Construction Railroad and Six Companies Railroad grades (26CK64046a and b) and the historic Lakeshore Road (26CK5383). It would run under the Basic Magnesium power line (26CK6756). A section of the trail would be built on the historic Basic Magnesium aqueduct access road adjacent to the aqueduct (26CK6755). Because the railroad grades, Lakeshore Road, and aqueduct access road were constructed as transportation routes, the impact of the trail on these sites is considered to be minor. The trail would cross under the Basic Magnesium power line adjacent to Lakeshore Road, therefore, the impact of the trail on this site is considered to be minor.

Having a trail with interpretive kiosks and wayside exhibits associated with these cultural resources would enable the park to educate more people about the cultural resources and history of the park. It would also enable the park to reach more people about the need to preserve our cultural heritage.

Cumulative Effects: As the population of the Las Vegas Valley continues to grow, development will destroy more of the valley's cultural resources. Development will also continue to encroach on the park boundary, putting more pressure on the park's cultural resources.

Conclusion: The trail would have a minor impact on cultural resources. There would be no impairment to cultural resources as a result of the impacts associated with this alternative.

Visual Resources
A paved trail in an area that currently does not have one would impact the natural appearance in the Boulder Basin area. However, the Boulder Basin area is considered a highly developed area of the park, and paved parking lots and overlooks are numerous. Human-made structures could detract from the natural appearance of the area. The kiosks and wayside exhibits would be designed to park standards and would blend into the surrounding area. Visual resources could slightly improve from trail construction, as non-motorized trail use would be emphasized and could reduce off-road vehicle use in the project area. Some people may consider this project beautification of lands previously scarred from utility corridors and road construction. Constructing a trail on previously disturbed corridors, providing stewardship information on the kiosks and wayside exhibits, and trail maintenance and monitoring activities could actually improve the overall appearance of the area. Therefore, the impacts to visual resources are considered minor negative impacts with some beneficial effects.

Cumulative Effects: Impacts to the visual resources that exist in the area include the Fish Hatchery, SNWA, powerlines, telemetry lines, water tanks, pipelines, marinas, launch ramps, roads, hotels, etc. This project would add a negligible visual intrusion compared with what currently exists in the Boulder Beach Development Zone.

Conclusion: Under this alternative, there would be minor, negative impacts to visual resources with some beneficial effects.

Public Safety and Visitor Experience
The existing Boulder Beach Trail, which is an unpaved 3.2 mile trail connecting Lake Mead Marina with the trailhead for the Historic Railroad Trail, would no longer be a gravel trail and would be widened and paved to be consistent with the River Mountains Loop Trail. Visitors who currently use the existing trail could be disappointed by the paving of the trail, and from the increased level of use expected after trail construction. Other visitors would be able to access the park as part of the 35-mile River Mountains Loop Trail, and would have an improved experience. Bicyclists who would choose to utilize the trail would be recreating in a safer environment than those who would continue to travel on Lakeshore Road. Visitation to the park could increase as trail use is expected to be year-round with peak use during the historically less frequented winter months.

Cumulative Effects: There would be no cumulative effects from this alternative.

Conclusion: Visitors who prefer a paved urban trail as part of the 35-mile River Mountains Loop Trail would benefit from this alternative. Those who currently use and prefer the unpaved Boulder Beach Trail may be disappointed by trail improvements. Trail construction would provide a safe, alternative travel route for bicyclists which would improve public safety. Portions of the trail would also provide a scenic travel route accessible to visitors in wheelchairs, strollers, and other non-motorized means of transportation.

Park Operations

Alternative B could impact park operations as maintenance and staff time could increase. Staff would be needed to monitor and maintain the trail and to monitor and control exotic species along the equestrian corridor. Enforcement officers could be needed to ensure that trail users, including equestrian users, adhere to the safety precautions and natural and cultural resource protection information displayed at kiosks. There is potential that trail users may deviate from the designated trail and venture onto sensitive and undisturbed areas, thus, increasing maintenance and enforcement needs. If this occurs, measures may have to be taken to ensure that resources are not negatively impacted and that enforcement is enacted.

Cumulative Effects: As park facilities are improved or constructed, staffing levels have decreased. Therefore, maintaining existing structures and facilities has become a challenge for park staff. Use of volunteers and partnering with local groups could help alleviate the issues associated with trail maintenance.

Conclusion: There could be minor to moderate negative impacts to park operations if volunteers are not available to assist with trail maintenance and monitoring.

Page left intentionally blank.

SECTION V: COORDINATION AND CONSULTATION

A 30-day public scoping period occurred between November 6 and December 6, 2002, through a press release (Appendix B). No comments were received.

Public notice of the availability of this environmental assessment was published in local newspapers, and on the Lake Mead NRA Internet Web site (http://www.nps.gov/lame). Individuals and organizations could request the environmental assessment in writing, by phone, or by e-mail. The environmental assessment was circulated to various federal and state agencies, individuals, businesses, and organizations on the park's mailing list for a 30-day public review period. Copies of the environmental assessment were made available at area libraries.

A copy of the environmental assessment can be obtained by direct request to:

Resource Management Division, Compliance Branch
National Park Service
Lake Mead National Recreation Area
601 Nevada Way
Boulder City, Nevada 89005
Telephone: (702) 293-8956
Facsimile: (702) 293-8008

Page left intentionally blank.

SECTION VII: LIST OF PREPARERS

Chanteil Walter, Environmental Protection Technician
Nancy E. Hendricks, Environmental Compliance Specialist
Jim Holland, Management Assistant
Dale Melville, Park Engineer
Michael Boyles, Wildlife Biologist
Steve Daron, Archeologist
Bret Guisto, Archeologist
Elizabeth Powell, Botanist
Dianne Bangle, Botanist
Mark Sappington, GIS
Joe Hutcheson, GIS

Page left intentionally blank**.**

SECTION VI: REFERENCES

AASHTO (American Association of State Highway and Transportation Officials). 1999. *Guide for the Development of Bicycle Facilities*. Prepared by the AASHTO Task Force on Geometric Design, Washington, DC.

NPS (US Department of the Interior, National Park Service). 1986. *Final Environmental Impact Statement, Lake Mead National Recreation Area General Management Plan*. Boulder City, Nevada.

----.1991. *Lake Mead National Recreation Area Draft Environmental Impact Statement: Lakeshore Road Reconstruction*. Boulder City, Nevada. November 1991.

----.1999. *Lake Mead National Recreation Area Resource Management Plan*. Boulder City, Nevada.

----.2001. *Lake Mead National Recreation Area Environmental Assessment: Las Vegas Wash Stabilization Project.* Prepared by Tetra Tech, Inc, Boulder, Colorado. Boulder City, Nevada. July 2001.

----.2001. *Lake Mead National Recreation Area Environmental Assessment: Construction of a Water Safety Center Boulder Beach.* Boulder City, Nevada. September 2001.

----.2001. *Lake Mead National Recreation Area Strategic Plan, 2000-2005*. Boulder City, Nevada.

----.2001. National Park Service, Lake Mead National Recreation Area, Park Facts. Internet Web site: http://www.nps.gov/lame/pphtml/facts.html.

----.2002. *Lake Mead National Recreation Area Environmental Assessment: Rehabilitation of Callville Bay Road.* Prepared by engineering-environmental Management, Inc. (e^2M), Boulder City, Nevada. July 2002.

----.2002. *Lake Mead National Recreation Area Lake Management Plan and Environmental Impact Statement.* Boulder City, Nevada.

----.2002. *Visitor and Visitor Use Statistics for December, 2002*, Lake Mead National Recreation Area. Boulder City, Nevada.

----.2003. *Lake Mead National Recreation Area Environmental Assessment: Realignment of South Telephone Cove Road*. Boulder City, Nevada. February 2003.

----.2003. *Lake Mead National Recreation Area Environmental Assessment: Renovation of the Lake Mead Fish Hatchery*. Boulder City, Nevada. March 2003.

Powell, Libby and Dianne Bangle. 2003. *Botanical Survey of River Mountains Loop Trail Proposed Route- Lake Mead Drive Entrance Station to Saddle Cove Axis Road*. Boulder City, Nevada.

River Mountains Trail Partnership. 2001. *River Mountains Loop Trail: A Trail Planning, Development, and Management Guide.* Boulder City, Nevada. January 2001.

River Mountains Trail Partnership Advisory Council. 2003. Proposed Trail Cross-Section. Accessed online at: http://www.rivermountainstrail.org/trail_cross_section.htm

----.2003. River Mountains Loop Trail Map. Accessed online at: http://www.rivermountainstrail.org/trail_map.htm

----.2003. Trail Monuments and Signage. Accessed online at: http://www.rivermountainstrail.org/proposed_trail_monuments.htm

USFWS (US Fish and Wildlife Service). 2000. Listed Species and Species of Concern within the Area Proposed to be covered under the Lake Mead National Recreation Area Lake Management Plan, USFWS, Nevada Fish and Wildlife Office, Reno, Nevada. April 4, 2000.

----.2003. Letter. Species List for the Proposed Construction of the River Mountains Loop Trail, Lake Mead National Recreation Area, Clark County, Nevada. File No. 1-5-03-SP-466. USFWS, Nevada Fish and Wildlife Office, Reno, Nevada. February 6, 2003.

----.2003. Threatened and Endangered Species System (TESS). Listings with a Current Range in Region 1. Accessed online at: http://ecos.fws.gov/tess_public/TESSWebpageRegionLists?lead_region=1#NV

APPENDIX A- LONG-RANGE INTERPRETIVE PLAN

Page left intentionally blank

APPENDIX B- NATIONAL PARK SERVICE PRESS RELEASE

Page left intentionally blank.

National Park Service
U.S. Department of the Interior

Lake Mead National
Recreation Area

601 Nevada Way
Boulder City, NV 89005

Phone: (702) 293-8947
Fax: (702) 293-8936

Lake Mead National Recreation Area News Release

Date: November 7, 2002 **Release #: 096-02**
For Immediate Release
Karla Norris, (702) 293-8947

Public Input Solicited for Projects at Lake Mead National Recreation Area

Superintendent William K. Dickinson announced today that the National Park Service is currently soliciting input for several projects proposed at Lake Mead National Recreation Area. Public input is sought to develop feasible alternatives and formulate issues related to the following projects:

The rehabilitation of the Northshore Road, from mile marker 20.8 to 30.3
Improvements to the Willow Beach, Arizona, waste water treatment facility
Reconstruction of a picnic area at South Cove, Arizona
Rehabilitation of the Roger's Spring picnic facility
Extension of the River Mountain Loop Trail within the boundaries of the recreation area
Placement of wayside exhibits along existing roadways in the recreation area
Realignment of South Telephone Cove Road, Arizona.

The National Park Service will be analyzing these proposals in accordance with the National Environmental Policy Act (NEPA) of 1969. The projects will each be evaluated in separate environmental documents.

Written comments on the projects should be received by December 6, 2002. To submit written comments, or to be included on the project mailing list, please write to: Superintendent, Lake Mead National Recreation Area, Attention: Environmental Compliance Specialist, 601 Nevada Way, Boulder City, Nevada 89005.

For further information on any of the listed projects, please contact Environmental Compliance Specialist Nancy Hendricks at (702) 293-8756.

Page left intentionally blank.

APPENDIX C

Listing of Threatened and Endangered Species – State of Nevada
http://ecos.fws.gov/webpage/webpage_region_lists.html
Accessed on August 13, 2003

Nevada -- 38 listings

Animals -- 30

Status	*Listing*
E	Chub, bonytail (*Gila elegans*)
E	Chub, Pahranagat roundtail (*Gila robusta jordani*)
E	Chub, Virgin River (*Gila seminuda (=robusta*)
E	Cui-ui (*Chasmistes cujus*)
E	Dace, Ash Meadows speckled (*Rhinichthys osculus nevadensis*)
E	Dace, Clover Valley speckled (*Rhinichthys osculus oligoporus*)
T	Dace, desert (*Eremichthys acros*)
E	Dace, Independence Valley speckled (*Rhinichthys osculus lethoporus*)
E	Dace, Moapa (*Moapa coriacea*)
T	Eagle, bald (lower 48 States) (*Haliaeetus leucocephalus*)
E	Flycatcher, southwestern willow (*Empidonax traillii extimus*)
E	Frog, mountain yellow-legged (southern California DPS) (*Rana muscosa*)
T	Naucorid, Ash Meadows (*Ambrysus amargosus*)
E	Poolfish, Pahrump (*Empetrichthys latos*)
E	Pupfish, Ash Meadows Amargosa (*Cyprinodon nevadensis mionectes*)
E	Pupfish, Devils Hole (*Cyprinodon diabolis*)
E	Pupfish, Warm Springs (*Cyprinodon nevadensis pectoralis*)
E	Skipper, Carson wandering (*Pseudocopaeodes eunus obscurus*)
T	Spinedace, Big Spring (*Lepidomeda mollispinis pratensis*)
E	Spinedace, White River (*Lepidomeda albivallis*)
E	Springfish, Hiko White River (*Crenichthys baileyi grandis*)
T	Springfish, Railroad Valley (*Crenichthys nevadae*)
E	Springfish, White River (*Crenichthys baileyi baileyi*)
E	Sucker, razorback (*Xyrauchen texanus*)
T(S/A)	Tortoise, desert (outside/taken from Sonoran Desert) (*Gopherus agassizii*)
T	Tortoise, desert (U.S.A., except in Sonoran Desert) (*Gopherus agassizii*)
T	Trout, bull (U.S.A., conterminous, lower 48 states) (*Salvelinus confluentus*)
T	Trout, Lahontan cutthroat (*Oncorhynchus clarki henshawi*)
T	Wolf, gray Western Distinct Population Segment (*Canis lupus*)
E	Woundfin (except Gila R. drainage, AZ, NM) (*Plagopterus argentissimus*)

Plants -- 8

Status	*Listing*
T	Milk-vetch, Ash meadows (*Astragalus phoenix*)
T	Centaury, spring-loving (*Centaurium namophilum*)
T	Sunray, Ash Meadows (*Enceliopsis nudicaulis* var. *corrugata*)
E	Buckwheat, steamboat (*Eriogonum ovalifolium* var. *williamsiae*)
T	Gumplant, Ash Meadows (*Grindelia fraxino-pratensis*)
T	Ivesia, Ash Meadows (*Ivesia kingii* var. *eremica*)
T	Blazingstar, Ash Meadows (*Mentzelia leucophylla*)
E	Niterwort, Amargosa (*Nitrophila mohavensis*)

Page left intentionally blank.